



**INPE**  
Programa  
Queimadas

# RISCO DE FOGO

## Anuário 2020

Registro histórico de todos os mapas de Risco de Fogo de 2020 e sua metodologia.

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# RISCO DE FOGO

## Anuário 2020

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pdf: <http://queimadas.dgi.inpe.br/queimadas/portal/outros-produtos/anuario-de-risco-de-fogo/>

### RESUMO

Esse documento tem como objetivo mostrar de forma resumida os cálculos necessários para obter o Risco de Fogo, uma variável importante que fornece informações sobre a possibilidade que uma determinada região pode ter para iniciar uma queimada de origem antrópica na vegetação. São necessárias algumas variáveis meteorológicas (precipitação, umidade relativa mínima e temperatura máxima do ar à superfície) e o mapa de vegetação para obter o risco de fogo. Alguns cálculos matemáticos e correções são feitas para obter essa variável. O produto final desse documento consiste em mapas diários de Risco de Fogo desde o dia 01 de janeiro a 31 de dezembro de 2020.

**Palavras-chave:** risco de fogo, precipitação, temperatura, umidade relativa.

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### ABSTRACT

This document aims to summarize the calculations needed to obtain the Fire Risk, an important variable that provides information about the possibility that a given region may have to initiate anthropogenic burn in the vegetation. Some meteorological variables (rainfall, minimum relative humidity and maximum air temperature at surface ) and the vegetation map are necessary to obtain the fire risk. Some mathematical calculations and corrections are made to obtain this variable. The final product of this document consists of daily Fire Risk maps from January 1 to December 31, 2020.

**Keywords:** fire risk, precipitation, temperature, relative humidity.

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## 1 Introdução

O princípio do Risco de Fogo (RF) é o de que quanto mais dias seguidos sem chuva em um local, maior o risco de queima da sua vegetação. Adicionalmente, são incluídos no cálculo os efeitos do tipo da vegetação e do ciclo natural de seu desfolhamento, da temperatura máxima e umidade relativa mínima do ar diária, assim como a presença de fogo na área de interesse.

O RF foi desenvolvido no Centro de Previsão de Tempo e Estudos Climáticos/Instituto Nacional de Pesquisas Espaciais (CPTEC/INPE), com base na análise da ocorrência de centenas de milhares de queimadas/incêndios nos principais biomas e tipos de vegetação do País durante as últimas décadas, em função das condições e históricos meteorológicos (SETZER et al., 1992; SISMANOGLU e SETZER, 2004). Sua primeira versão operacional data de 2002. O cálculo do RF é um dos produtos do Programa de Monitoramento de Queimadas e Incêndios Florestais do INPE (<http://www.inpe.br/queimadas/portal>), por sua vez inserido na Ação 20V9 do MCTIC no atual PPA-Plano Pluri Anual do Governo Federal.

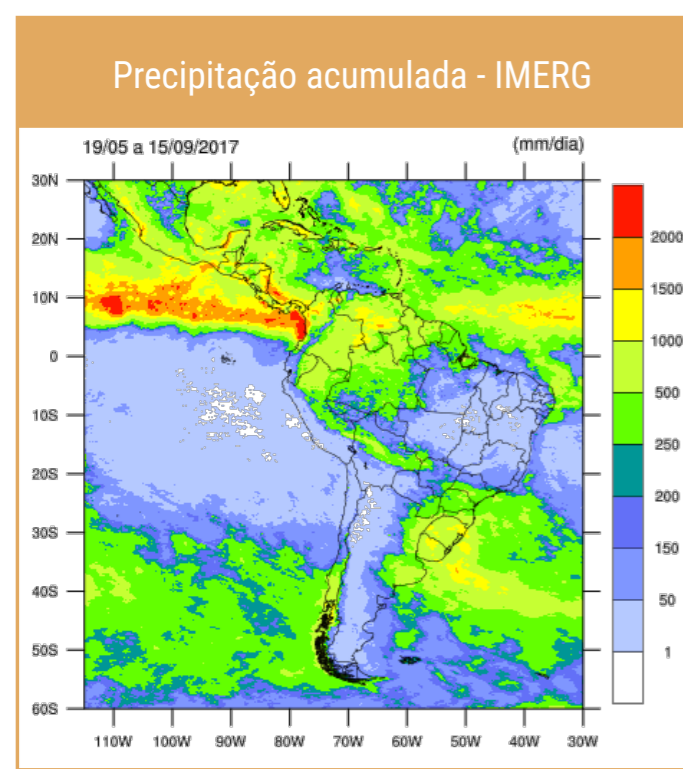
A base dos cálculos do RF está no conceito dos “Dias de Secura” ou “Secura” (PSE), que corresponde ao número de dias seguidos sem nenhuma precipitação durante os últimos 120 dias em relação à data de interesse. No caso de ocorrência de precipitação no período analisado, o PSE calcula um número hipotético correspondente de dias consecutivos sem chuva. É fundamental levar em conta que o RF indica quão propícia a vegetação está para ser queimada do ponto de vista meteorológico e, que o fogo na grande maioria dos casos é iniciado pelo homem e não naturalmente, como por exemplo, por raios.

## 2 Fonte de Dados

Para o cálculo do Risco de Fogo são necessárias informações diárias das seguintes variáveis: precipitação diária (mm/dia), temperatura do ar (°C) e umidade relativa (décimos).

### 2.1 PRECIPITAÇÃO

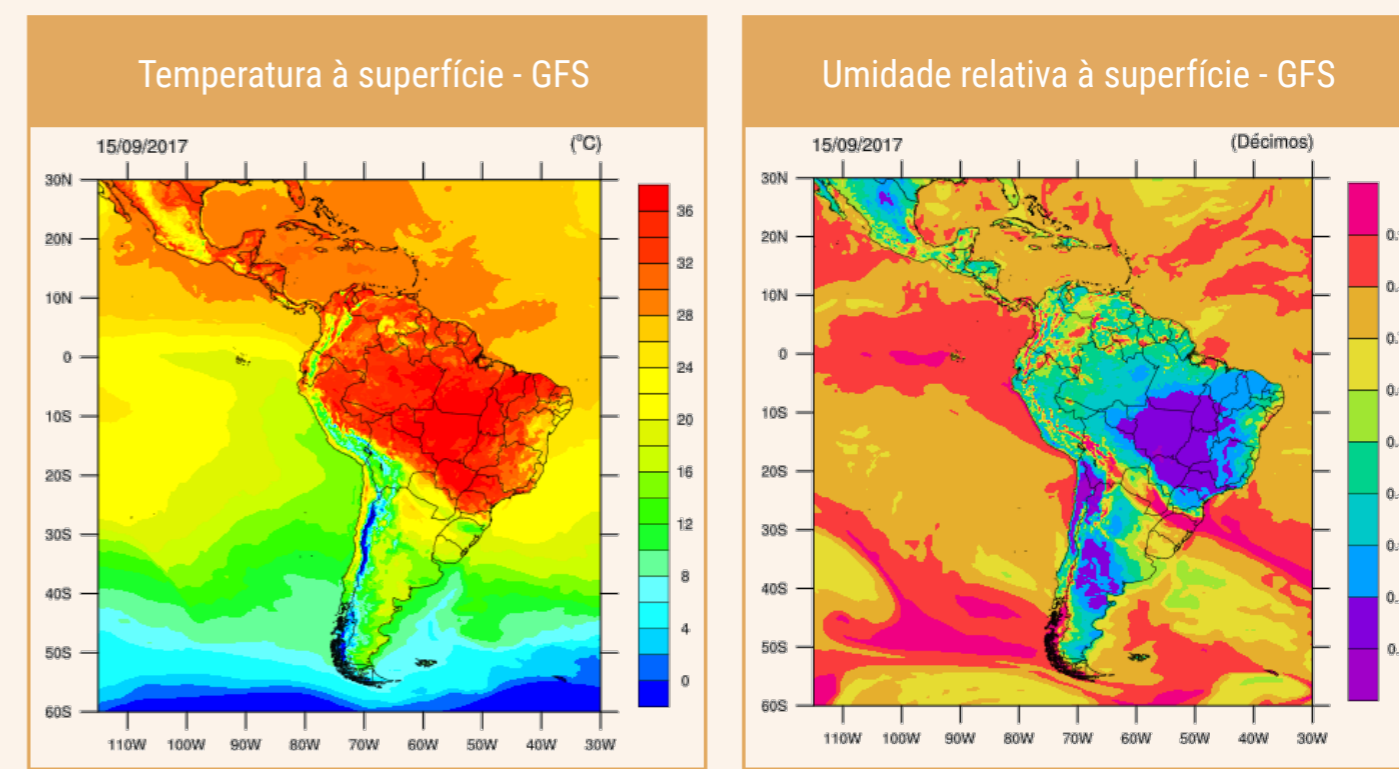
O campo de precipitação, que é a componente de maior peso do RF, é obtido na resolução espacial de 10 km a partir das estimativas de precipitação do IMERG - Integrated Multi-satellitE Retrievals for GPM (HUFFMAN et al., 2014, 2015), as quais combinam dados observacionais das estações de superfície com as medidas em micro-ondas dos atuais satélites do programa Global Precipitation Measurement (GPM, HOU et al., 2014) e dos antigos Tropical Rainfall Measuring Mission (TRMM, VILA et al., 2008). As estimativas IMERG são particularmente indicadas nas áreas com baixa densidade de estações de superfície, como por exemplo, na Amazônia. Exemplo desse campo pode ser observado na Figura 2.1.



**Figura 2.1** - Precipitação acumulada para 120 dias (19 de maio a 15 de setembro de 2017) obtida do IMERG. Estes campos são produzidos diariamente para períodos de 1 a 120 dias anteriores em relação ao dia do cálculo.

### 2.2 TEMPERATURA E UMIDADE DO AR À SUPERFÍCIE

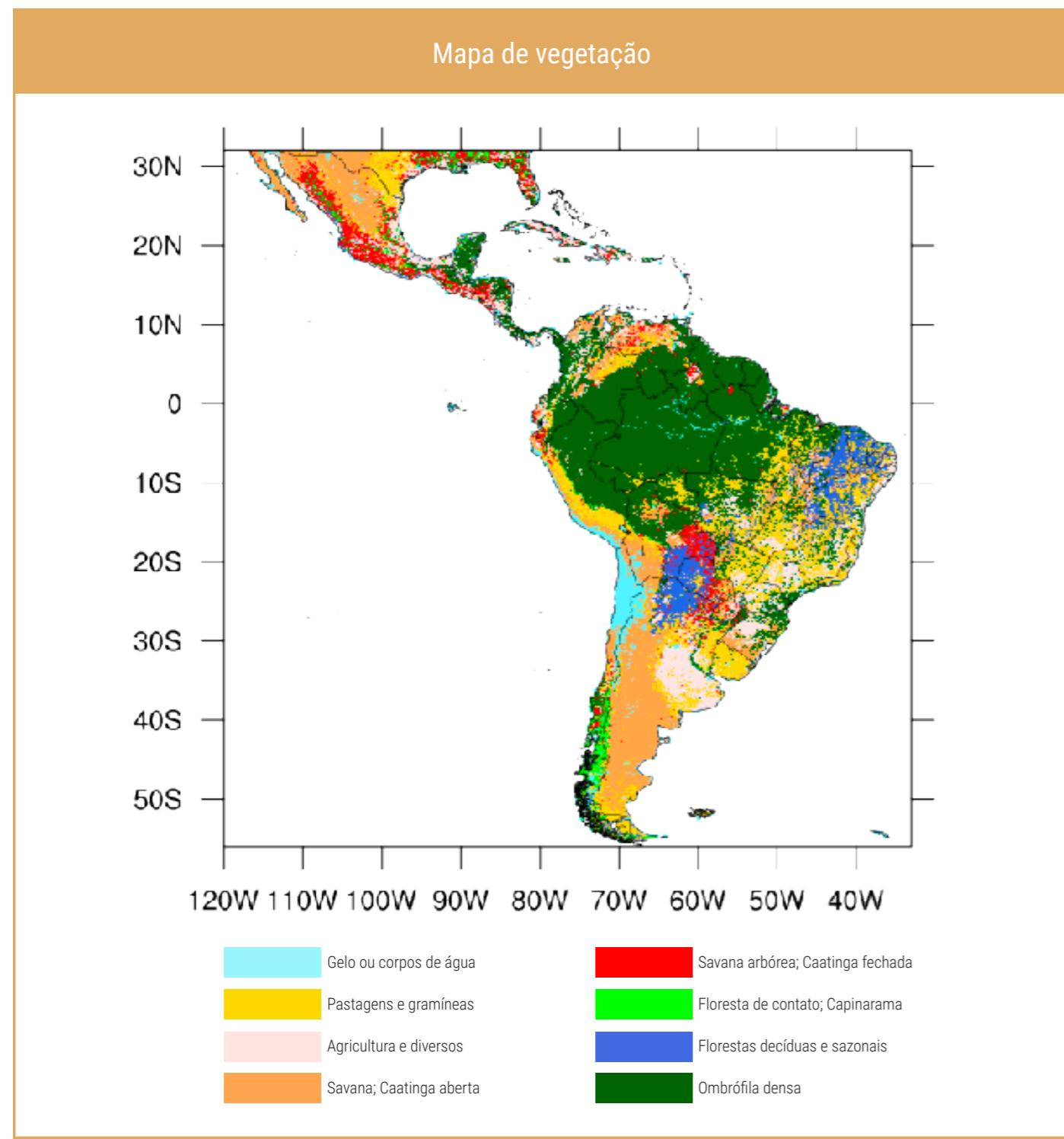
Os campos de temperatura máxima (°C) e de umidade relativa mínima do ar (décimos) no horário das 18UTC à superfície são obtidos das análises do modelo GFS (Global Forecast System, <http://www.emc.ncep.noaa.gov/GFS/doc.php>) na resolução espacial de 25 km. Exemplos desses campos podem ser observados na Figura 2.2a e 2.2b.



**Figura 2.2** - a) Temperatura do Ar à superfície às 18UTC; b) Umidade Relativa do Ar à superfície às 18UTC.

### 2.3 MAPA DE VEGETAÇÃO

O mapa de tipos de vegetação (Figura 2.3) para os cálculos do RF foi adaptado do produto anual do International Geosphere-Biosphere Programme (IGBP, <http://www.igbp.net>), por sua vez gerado pela National Aeronautics and Space Administration (NASA) a partir dos mosaicos do Moderate Resolution Imaging Spectroradiometer (MODIS) com resolução espacial de 1 km do satélite AQUA (FRIEDL et al., 2010). O mapa mais atual do IGBP é referente ao 2017.



**Figura 2.3** - Mapa de vegetação do IGBP combinado com o MapBiomas utilizado no cálculo do Risco de Fogo observado.

As 17 classes originais (Tabela 2.1) de vegetação adotada pelo IGBP foram condensadas em sete classes principais:

- 1) Pastagens e Gramíneas;
- 2) Agricultura e Diversos;
- 3) Savana; Caatinga aberta;
- 4) Savana arbórea; Caatinga fechada;
- 5) Floresta de contato; Campinarana;
- 6) Florestas decíduas e sazonais;
- 7) Ombrófila densa.

A nomenclatura usada foi a do Instituto Brasileiro de Geografia e Estatística (IBGE), apresentada em <http://mapas.ibge.gov.br/tematicos/vegetacao.html>. O "-x-" indica que não é atribuído nenhum valor a essa constante. Os valores da constante "A" (constante de flamabilidade) são utilizados para calcular o Risco de Fogo.

A partir desse mapa de vegetação foram feitas atualizações apenas para o Brasil utilizando o projeto MapBIOMAS (<http://mapbiomas.org>). As informações são disponibilizadas desde 2016 até 2017. Dessa forma, a representação das mudanças no padrão de vegetação podem ser avaliadas anualmente.

As informações do mapa de vegetação são utilizadas para informar o quão propícia a vegetação estará para iniciar um incêndio dependendo do seu tipo.

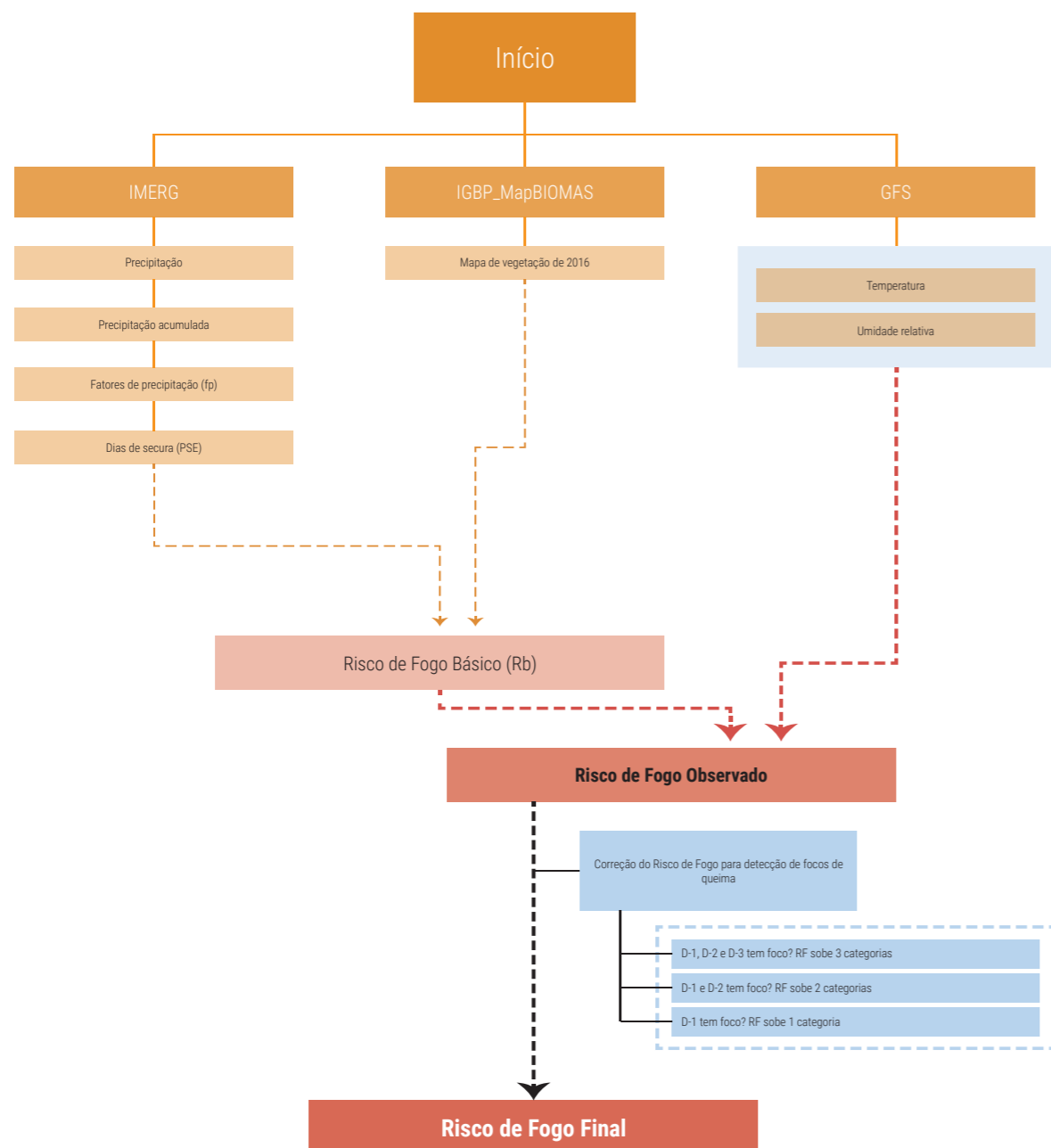
**Tabela 2.1** - Classes de Vegetação, Classes principais e valores da constante "A".

Classes de Vegetação do IGBP	Classes principais	Classes IBGE (agrupadas)	Constante "A"
0 Water	0	Corpos d'água	-x-
1 Evergreen Needleleaf forest	5	Floresta de contato; Campinarana	2,0
2 Evergreen Broadleaf forest	7	Ombrófila densa	1,5
3 Deciduous Needleleaf forest	5	Floresta de contato; Campinarana	2,0
4 Deciduous Broadleaf forest	6	Florestas decíduas e sazonais	1,72
5 Mixed forest	5	Floresta de contato; Campinarana	2,0
6 Closed shrublands	4	Savana arbórea; Caatinga fechada	2,4
7 Open shrublands	3	Savana; Caatinga aberta	3,0
8 Woody savannas	4	Savana arbórea; Caatinga fechada	2,4
9 Savannas	3	Savana; Caatinga aberta	3,0
10 Grasslands	1	Pastagens e gramíneas	6,0
11 Permanent wetlands	0	Alagados permanentes	1,5
12 Croplands	2	Agricultura e diversos	4,0
13 Urbanand built-up	0	Áreas urbanas e construídas	-x-
14 Cropland/Natural vegetation mosaic	2	Agricultura e diversos	4,0
15 Snow and ice	0	Neve e gelo	-x-
16 Barren or sparsely vegetated	0	Solos expostos; mineração	-x-

# 3 Metodologia para o cálculo do Risco de Fogo

Inicialmente, calculam-se as precipitações acumuladas para 11 períodos distintos que serão utilizados para obter os fatores de precipitação. Obtido esses fatores, calculam-se os dias de seca (PSE) combinados com o tipo de vegetação para em seguida gerar o Risco de Fogo Básico. Posteriormente, a partir da Umidade Relativa Mínima e da Temperatura Máxima do Ar à superfície realizam-se alguns cálculos matemáticos para obter-se o Risco de Fogo Observado. Finalmente, realiza-se a correção do risco por meio das ocorrências dos focos de queimadas nos últimos 3 dias.

**Figura 3.1** - Mapa de vegetação do IGBP combinado com o MapBiomas utilizado no cálculo do Risco de Fogo observado.



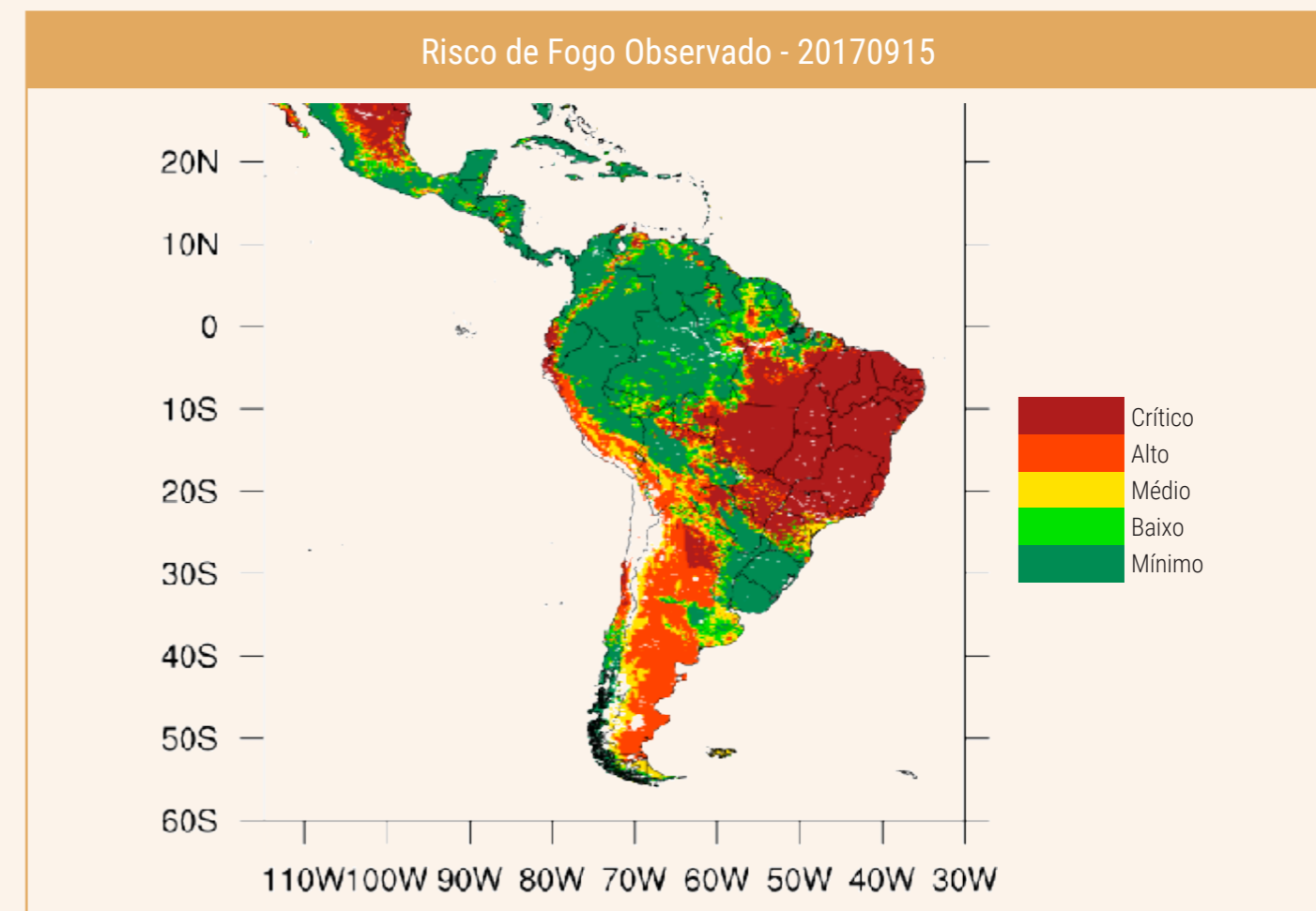
Para informações mais detalhadas sobre o cálculo do Risco de Fogo, acessar o link abaixo: [http://queimadas.cptec.inpe.br/~rqueimadas/documentos/RiscoFogo\\_Sucinto.pdf](http://queimadas.cptec.inpe.br/~rqueimadas/documentos/RiscoFogo_Sucinto.pdf)

Após calcular o Risco de Fogo Final, é feita a sua classificação por categorias, como mostra a Tabela 3.1.

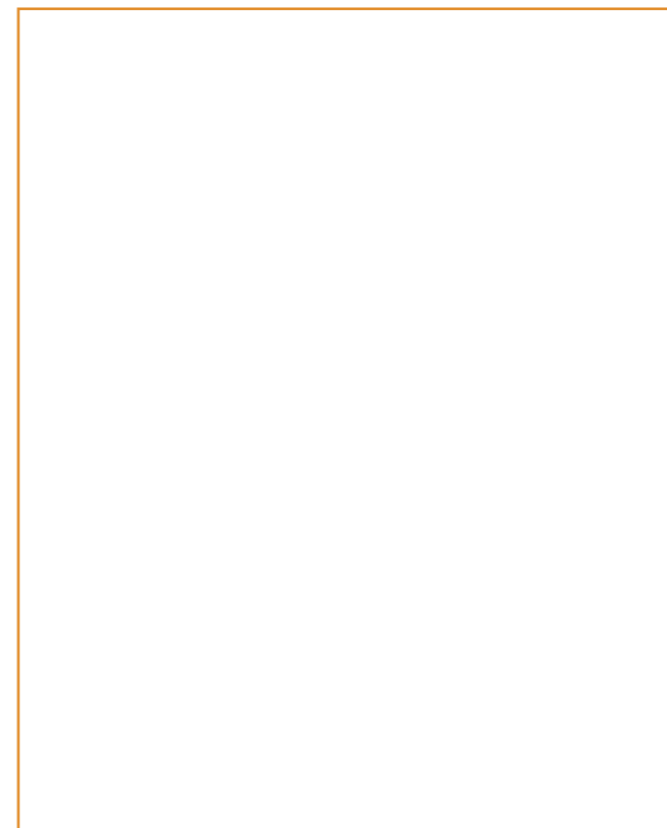
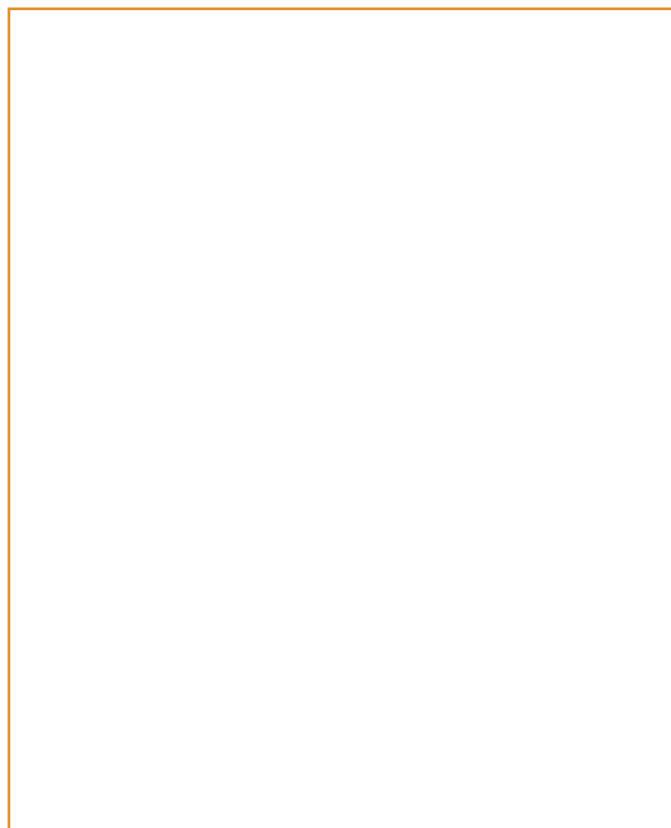
**Tabela 3.1** - Categorias de Risco de Fogo

Risco	Valores do Risco de Fogo (RF)	Cor
Mínimo	$RF \leq 0,15$	Verde
Baixo	$0,15 < RF \leq 0,40$	Verde claro
Médio	$0,40 < RF \leq 0,70$	Amarelo
Alto	$0,70 < RF \leq 0,95$	Laranja
Crítico	$RF > 0,95$	Marrom

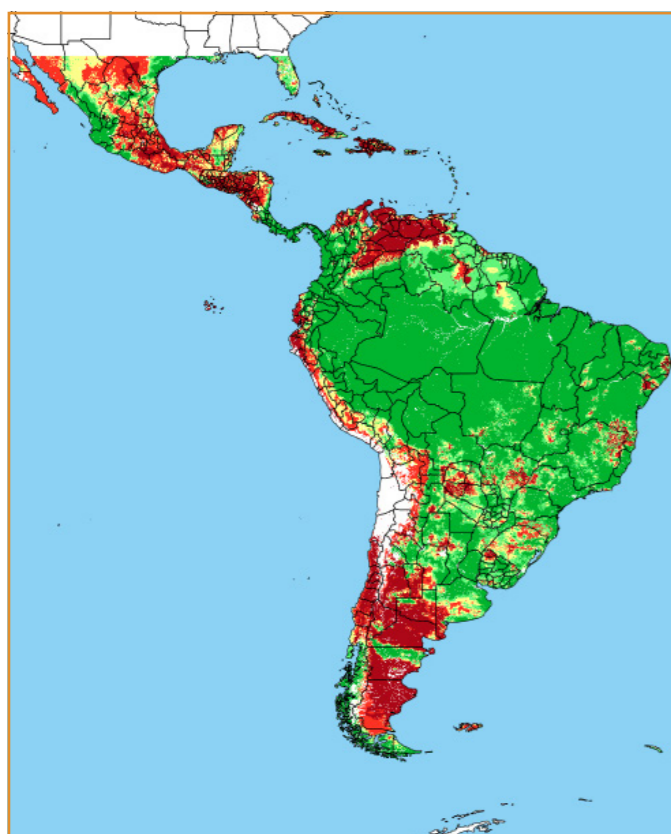
A Figura 3.2 mostra graficamente o resultado do cálculo do Risco de Fogo para o dia 15 de setembro de 2017 com base nas informações das Figuras 2.1, 2.2 e 2.3.



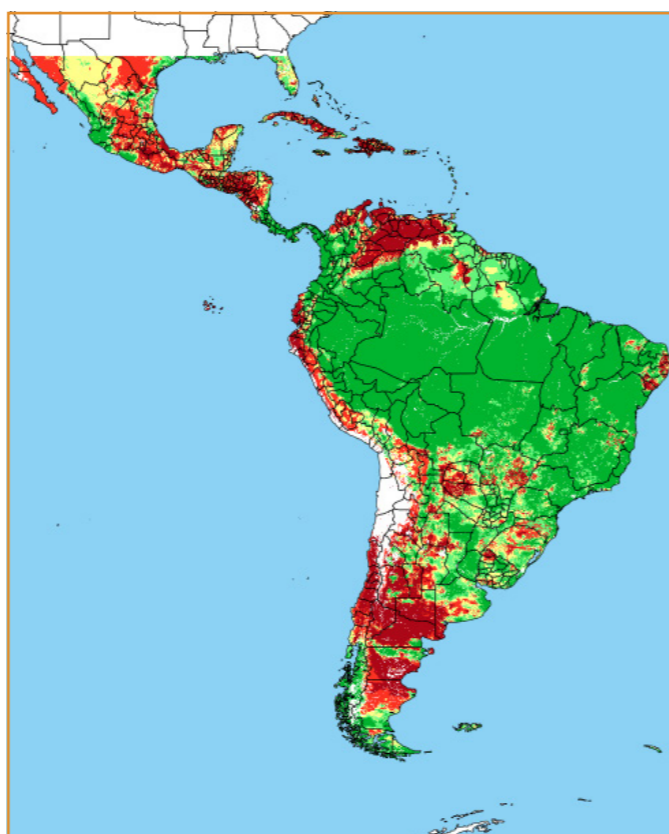
**Figura 3.2** - Risco de Fogo Observado para o dia 15 de setembro de 2017 e classificado em 5 categorias que variam de mínimo (verde = 0) a crítico (marrom = 1).



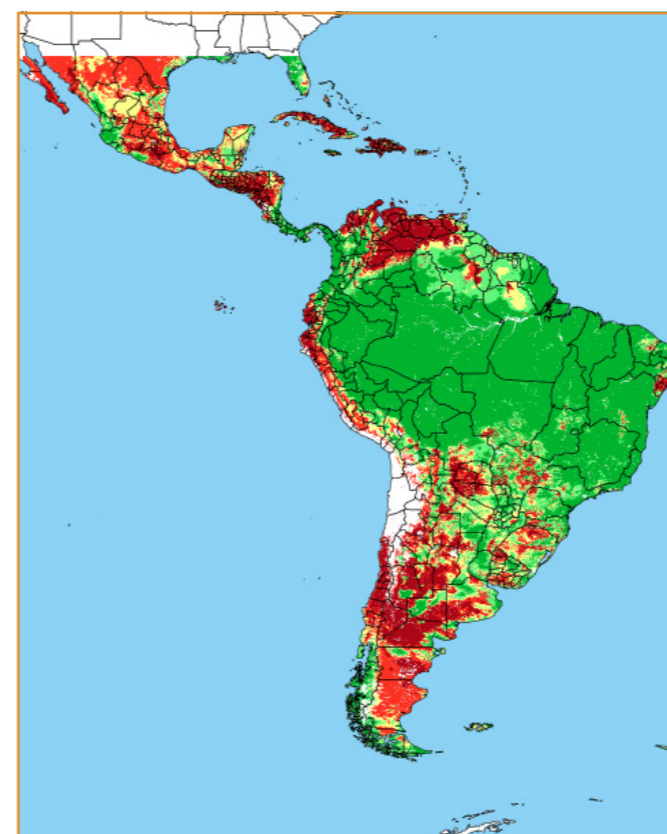
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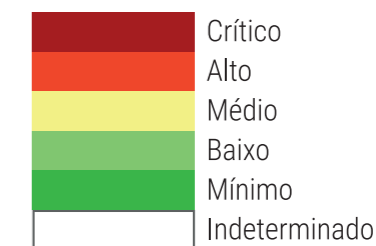
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sexta-feira, 3 de janeiro

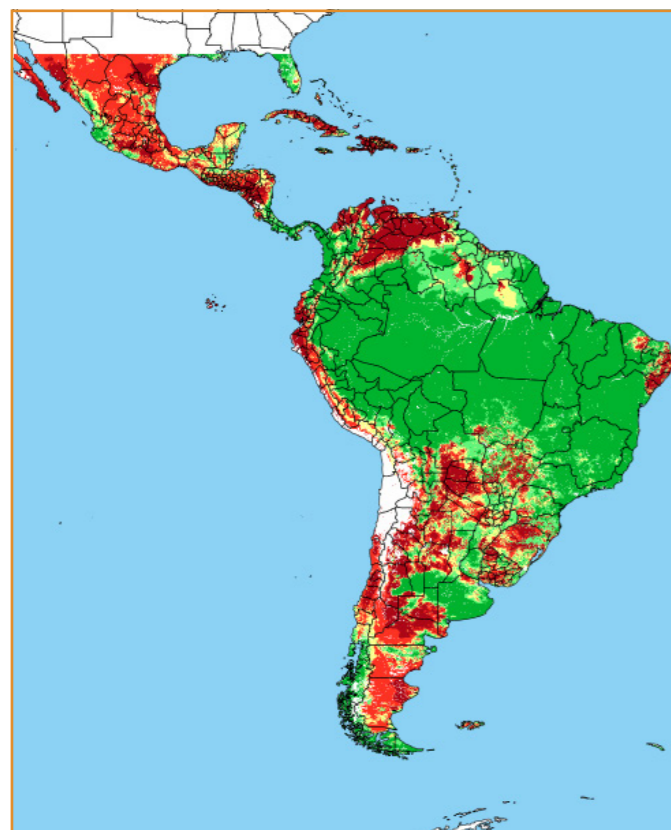


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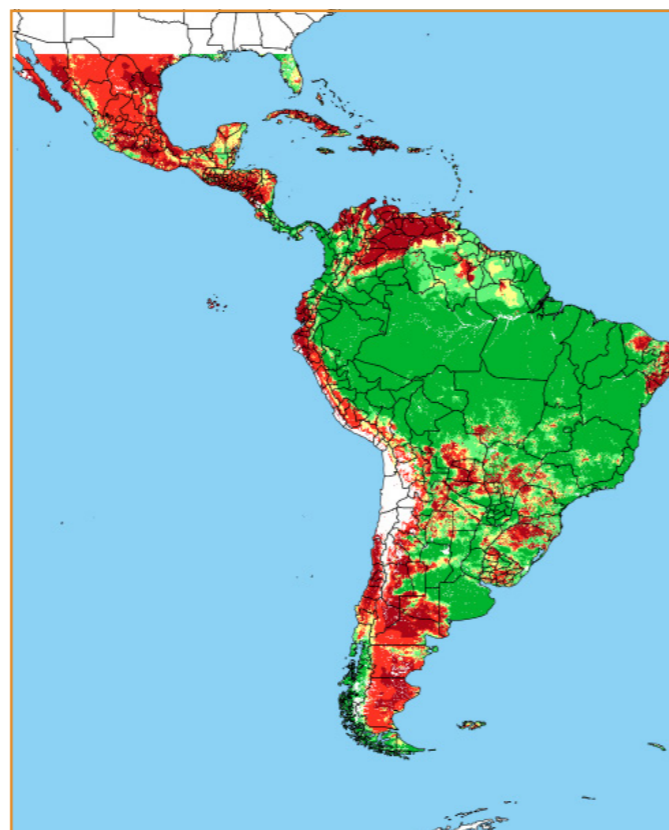


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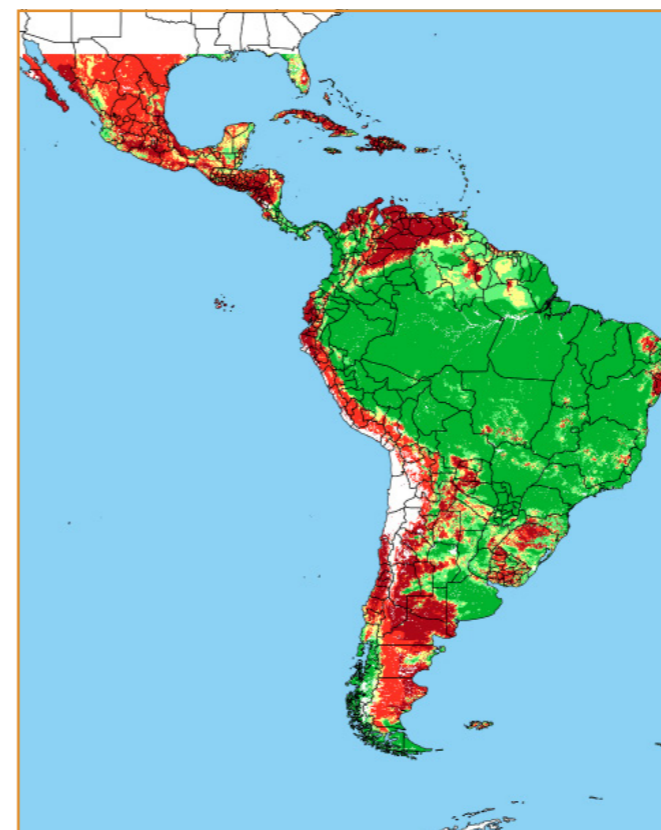
CALENDÁRIO JULIANO



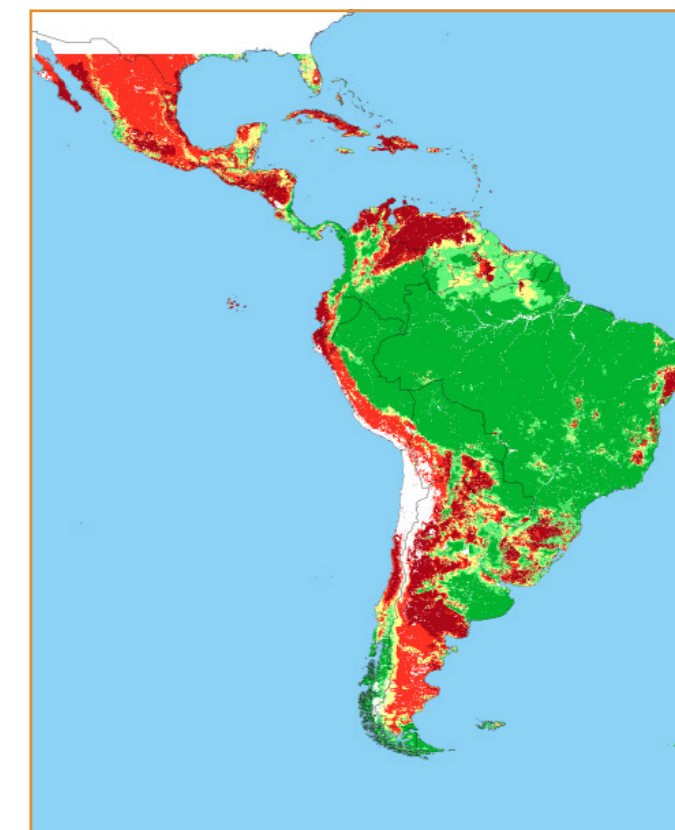
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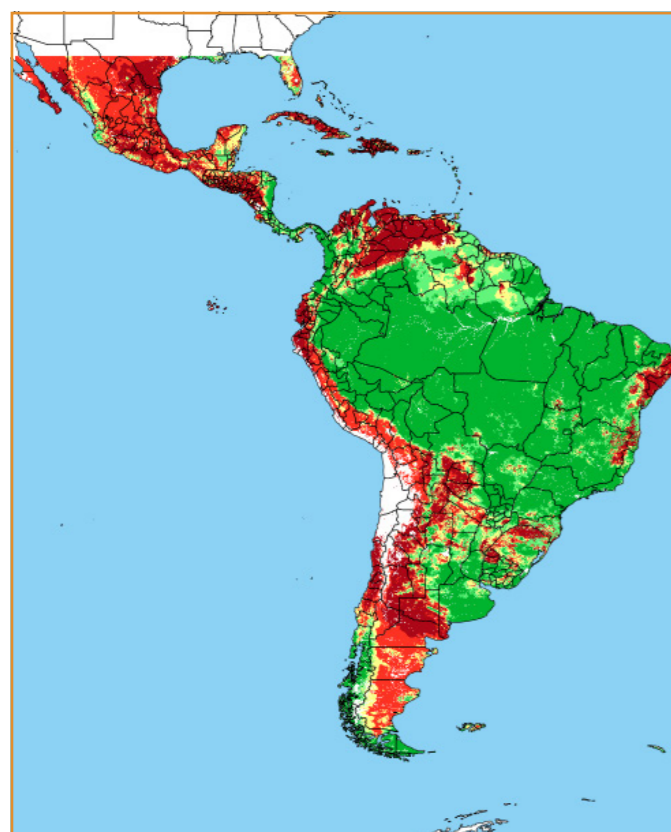
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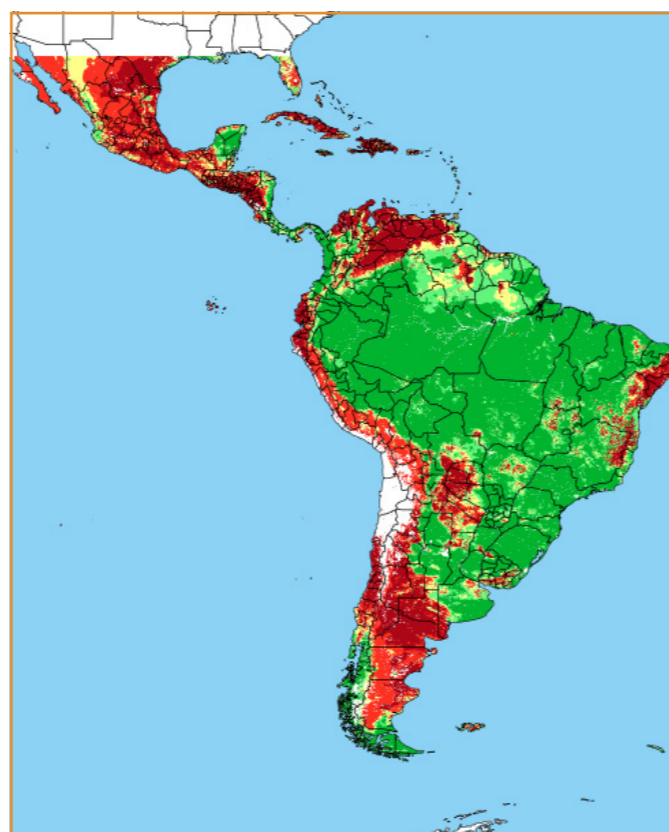
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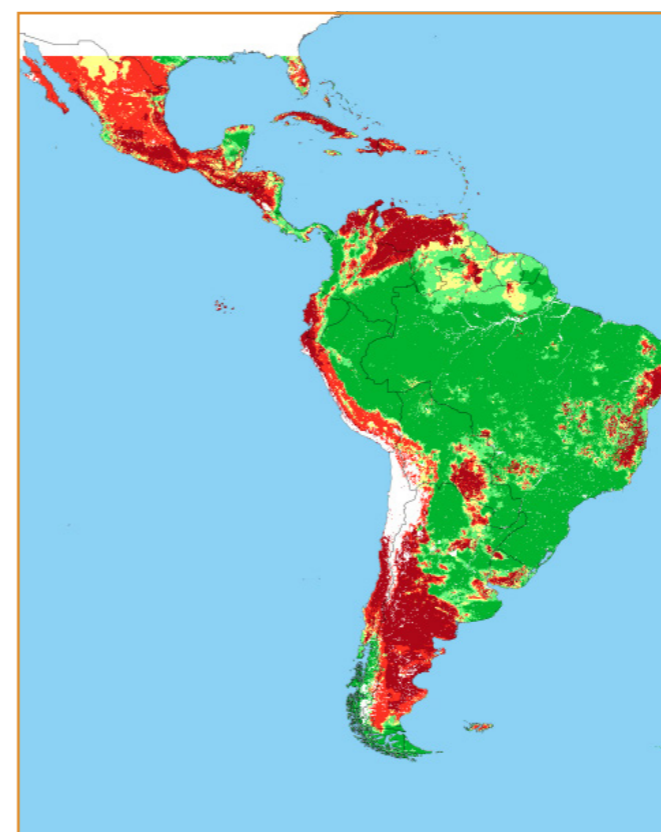
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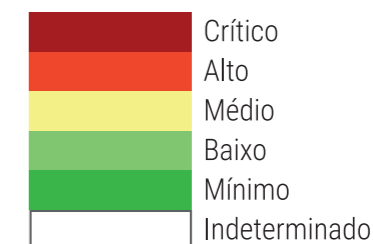
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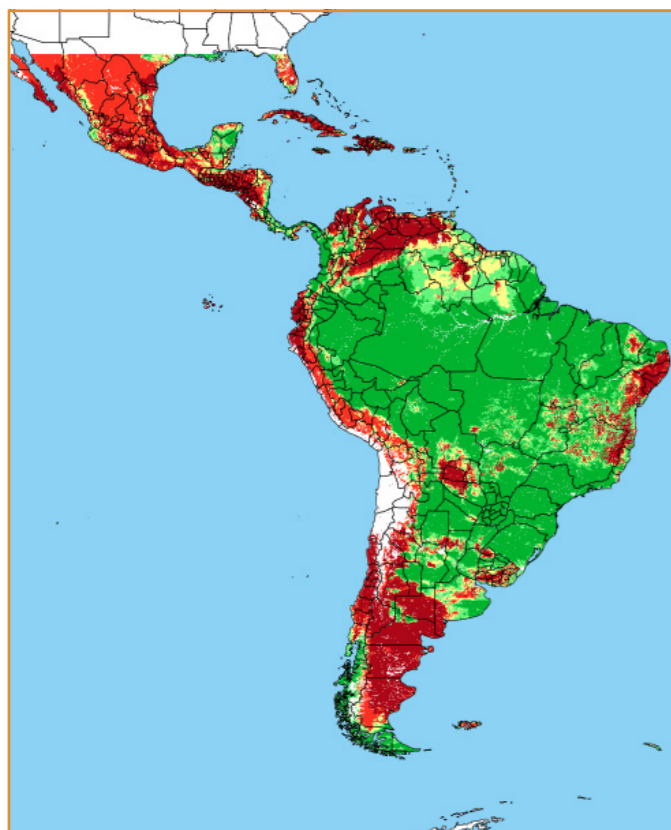


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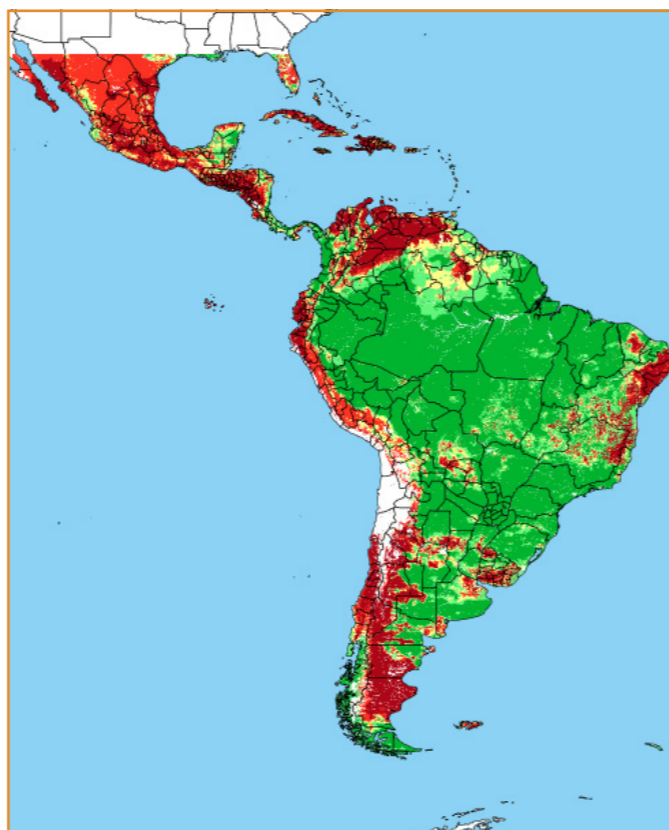
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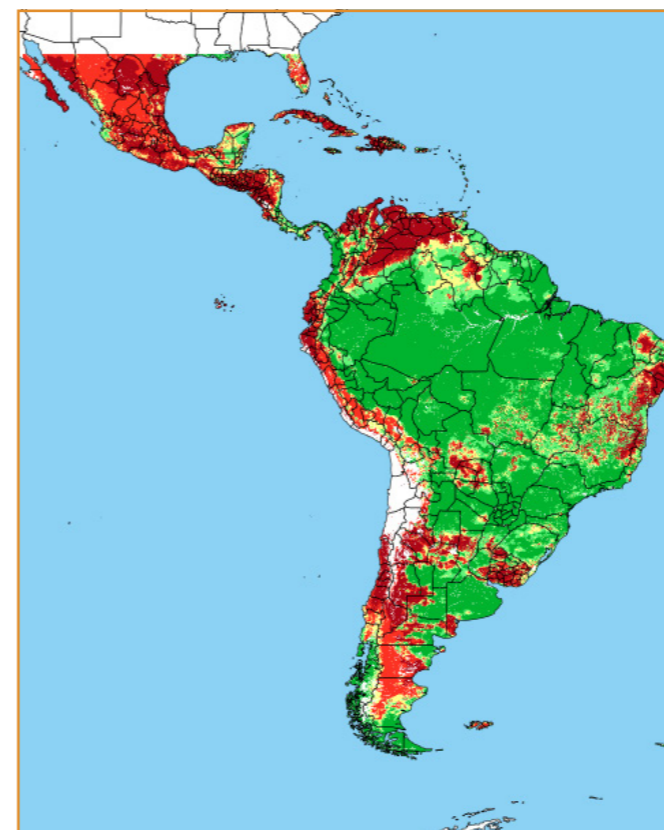




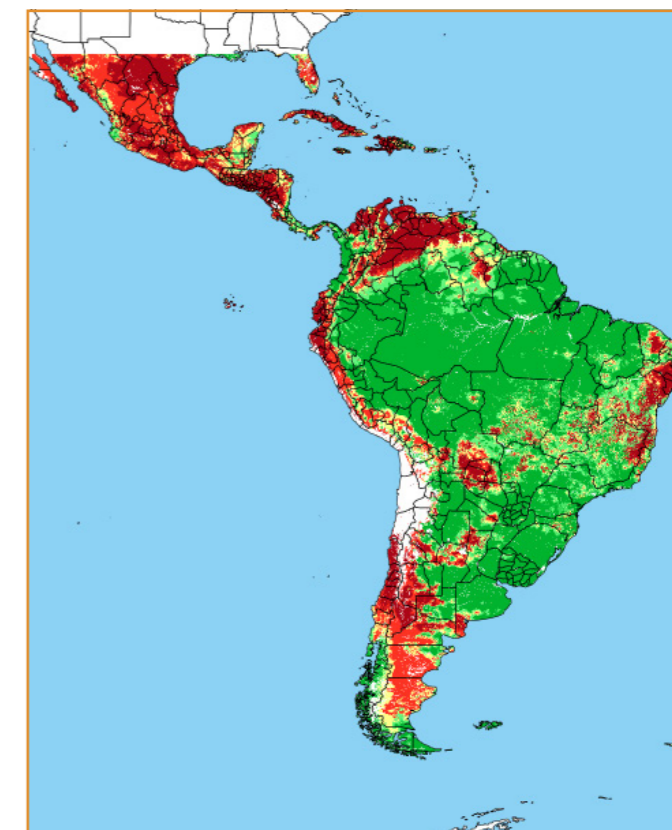
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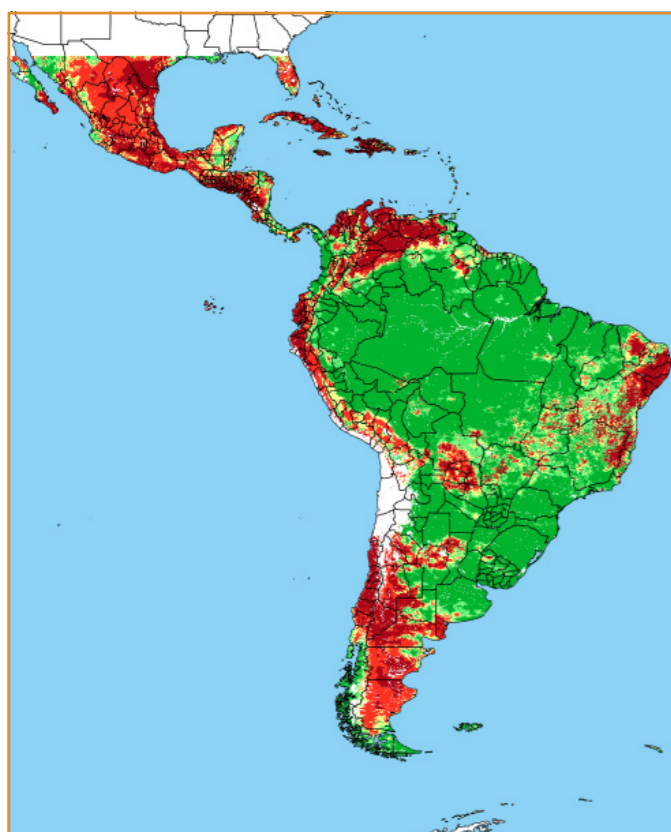
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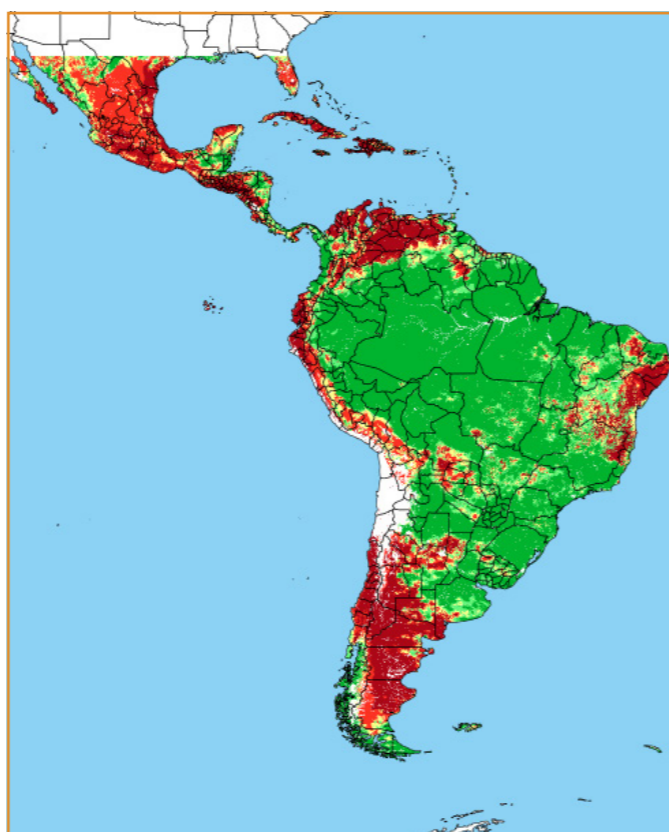
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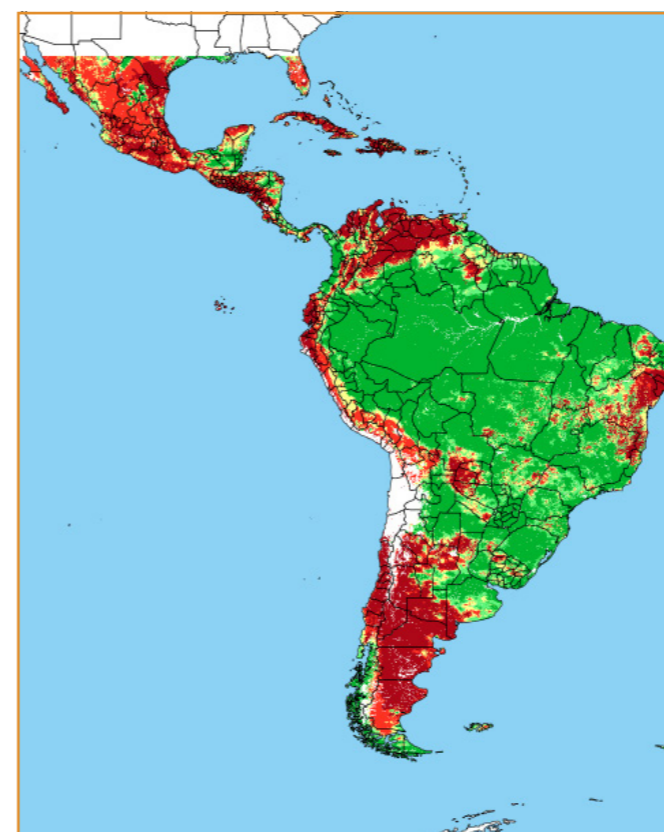
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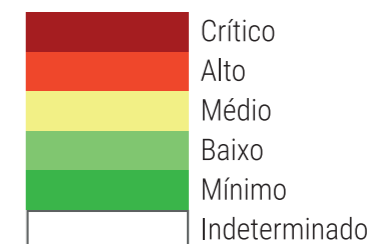
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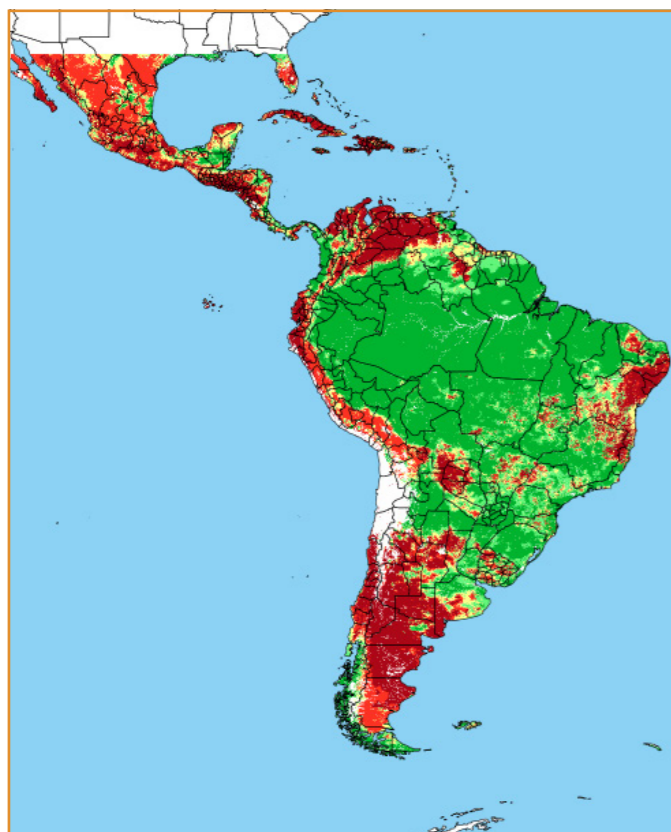
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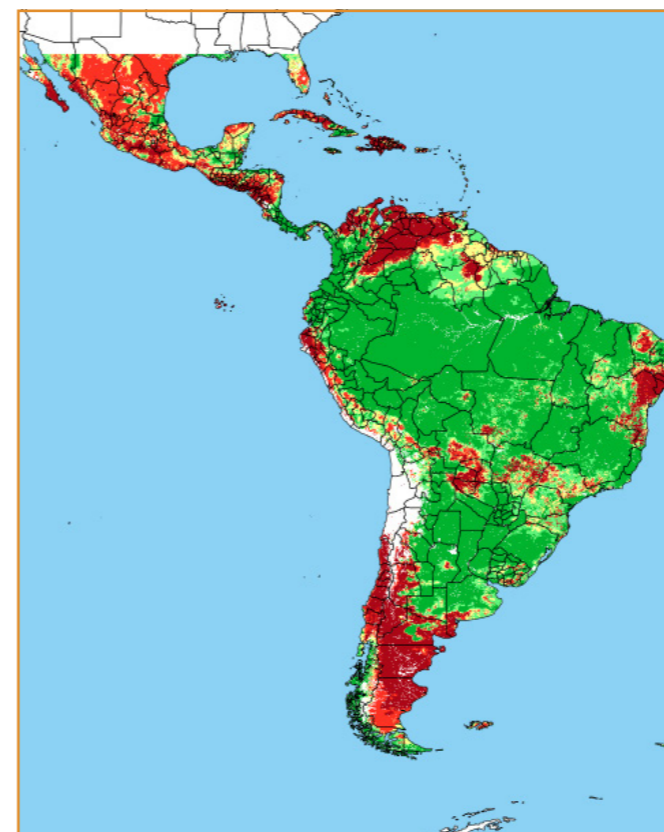
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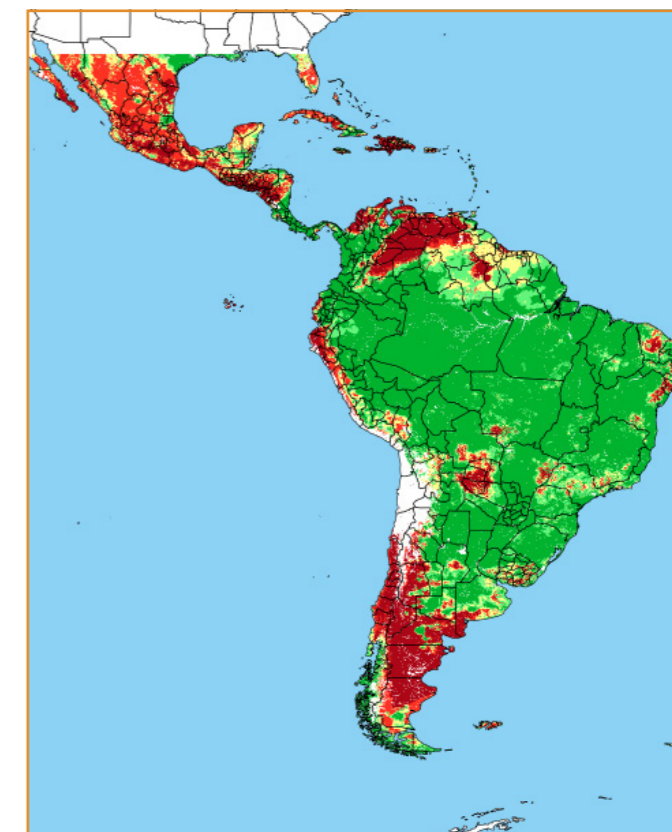
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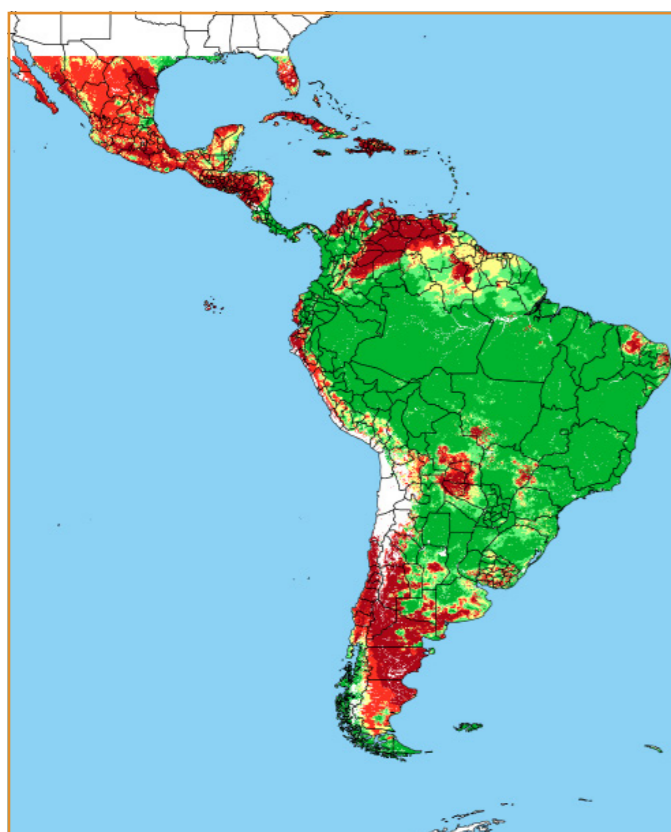
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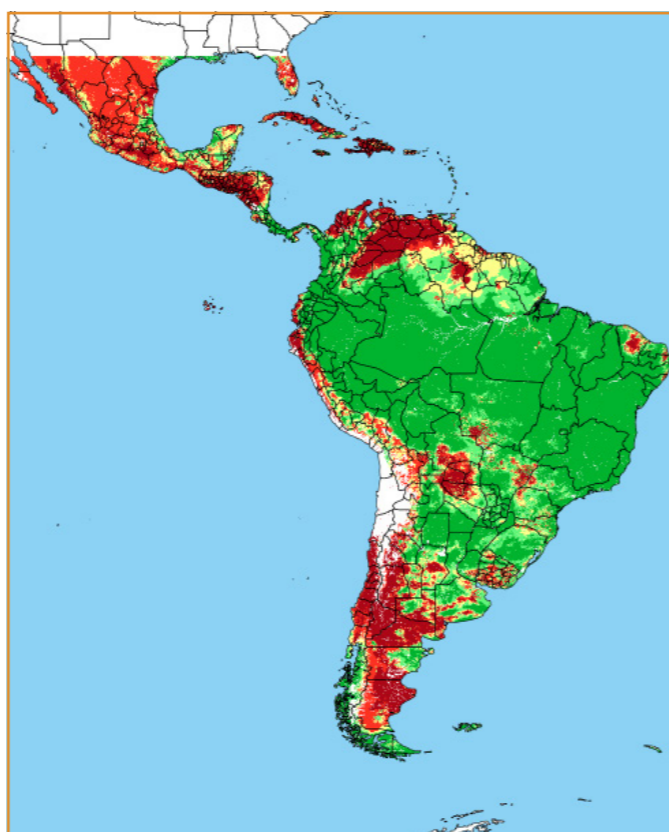
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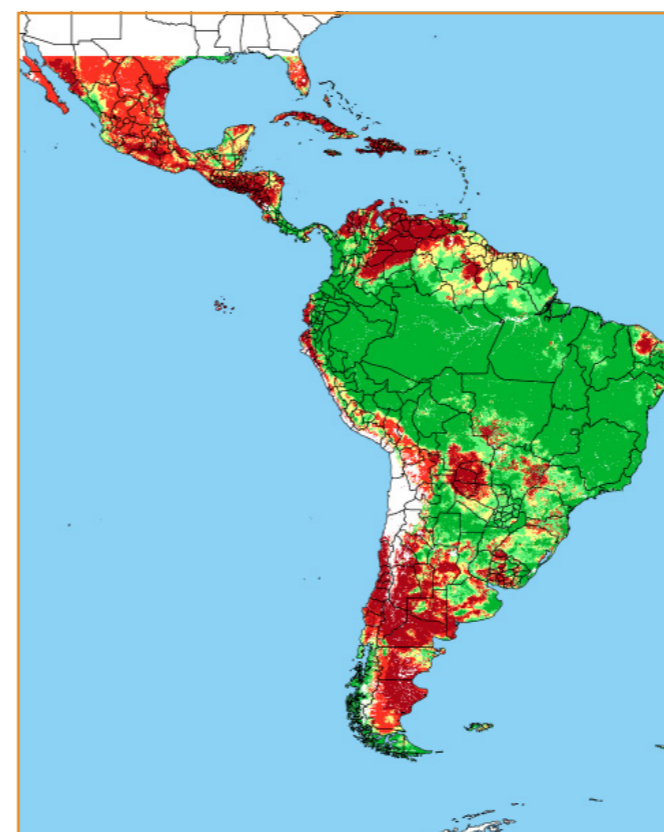
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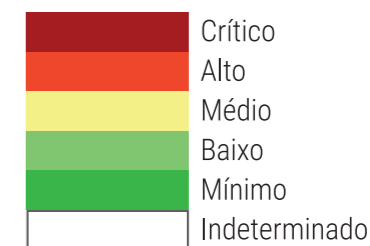
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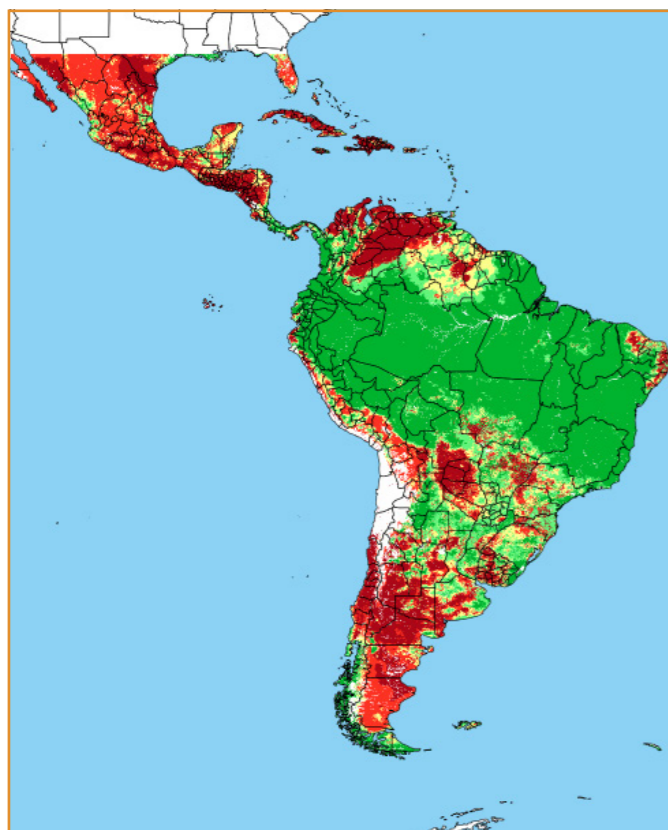
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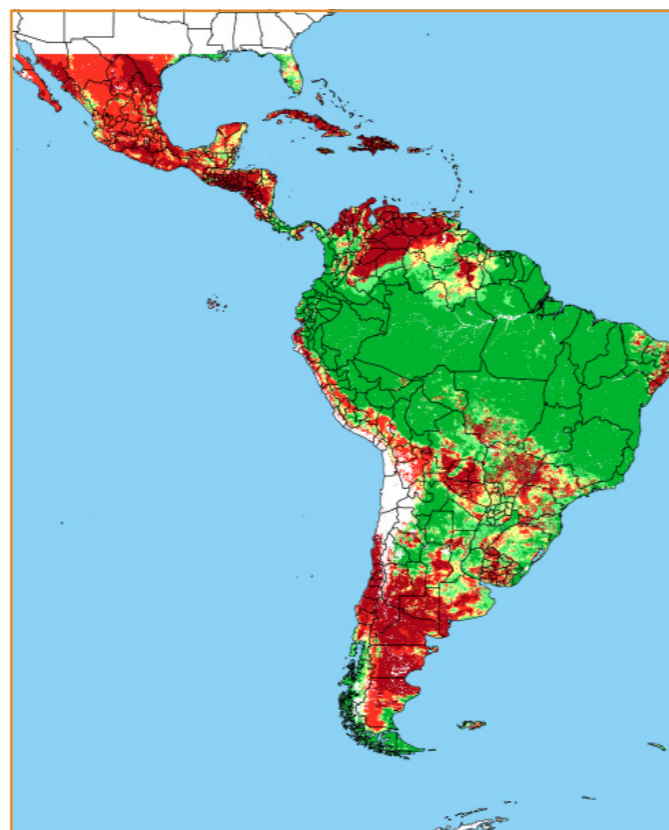
JANEIRO / 2020

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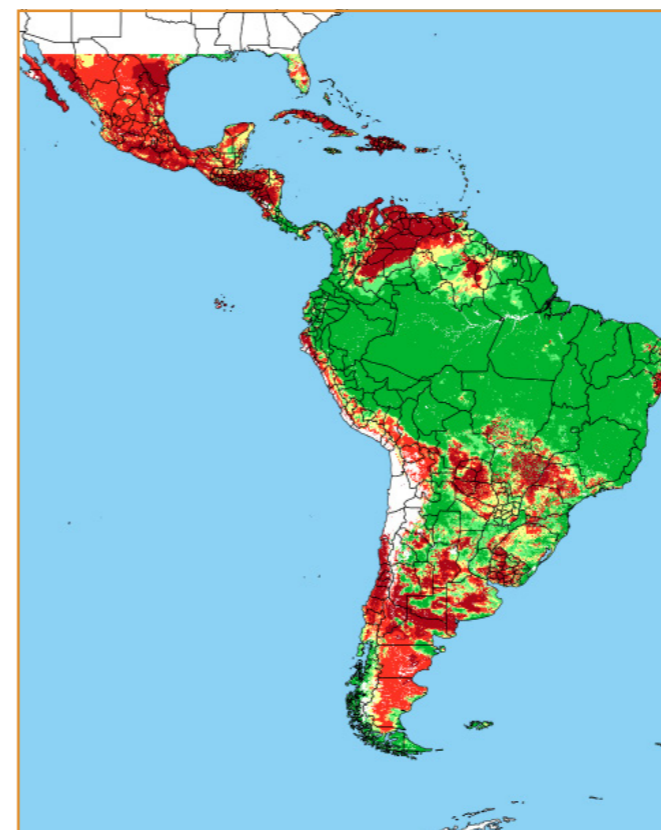
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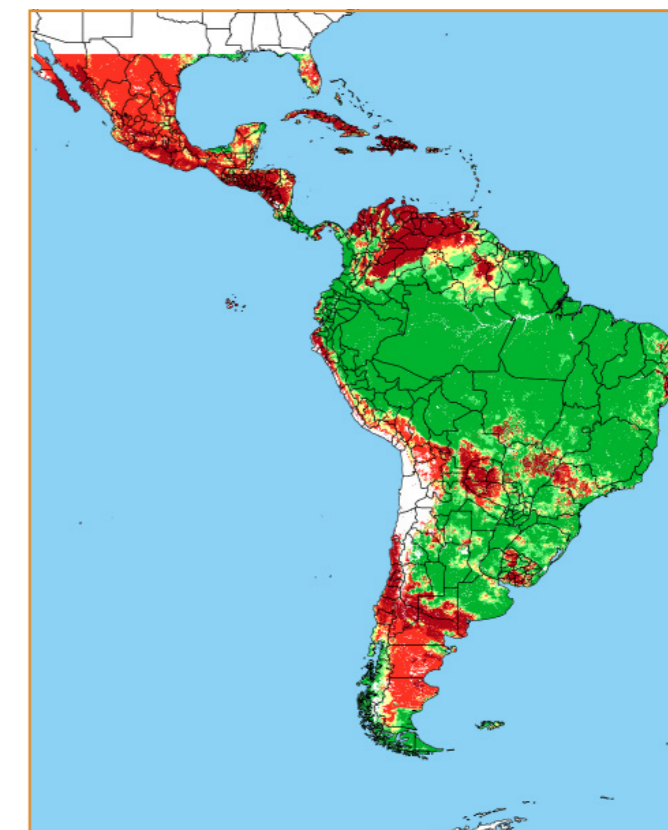
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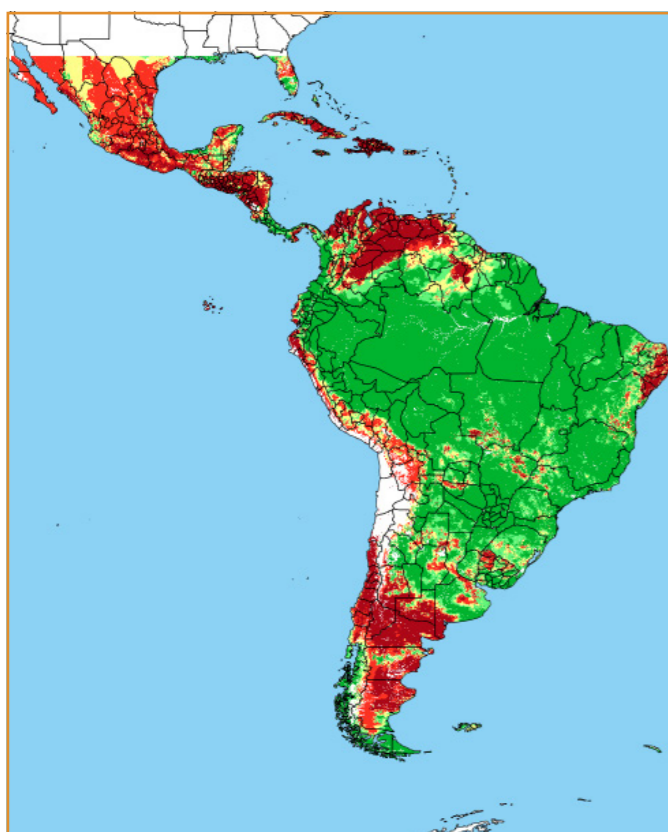
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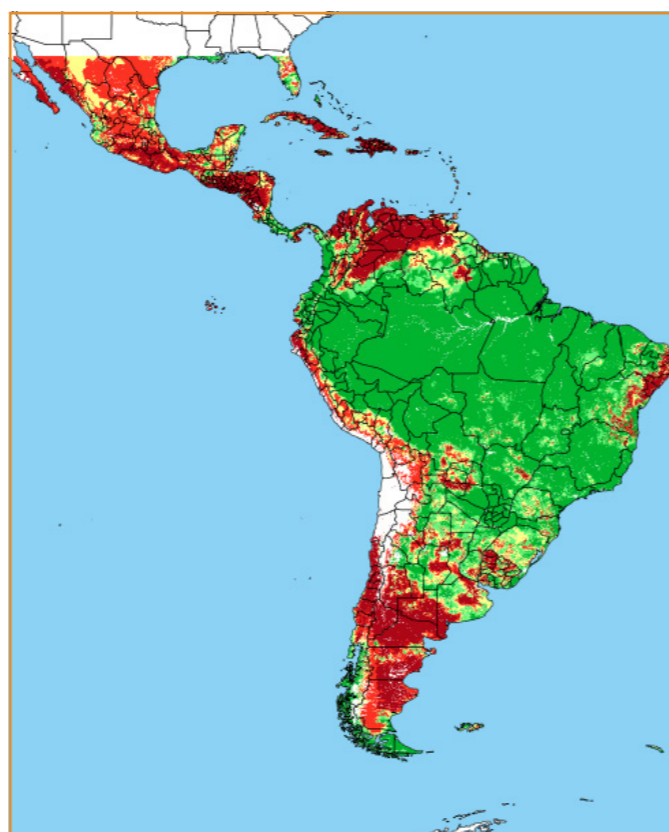
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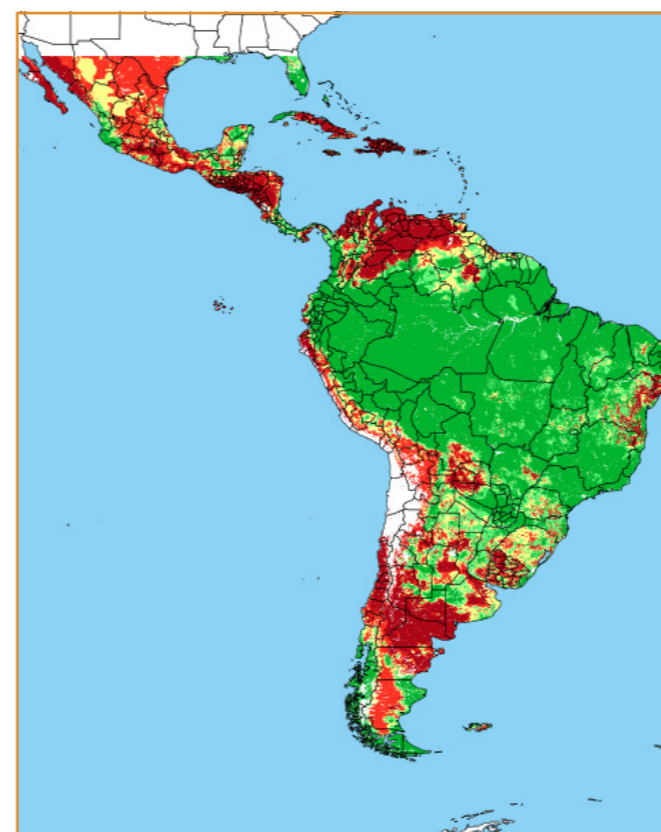
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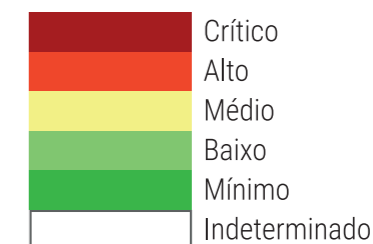
quinta-feira, 30 de janeiro



sexta-feira, 31 de janeiro



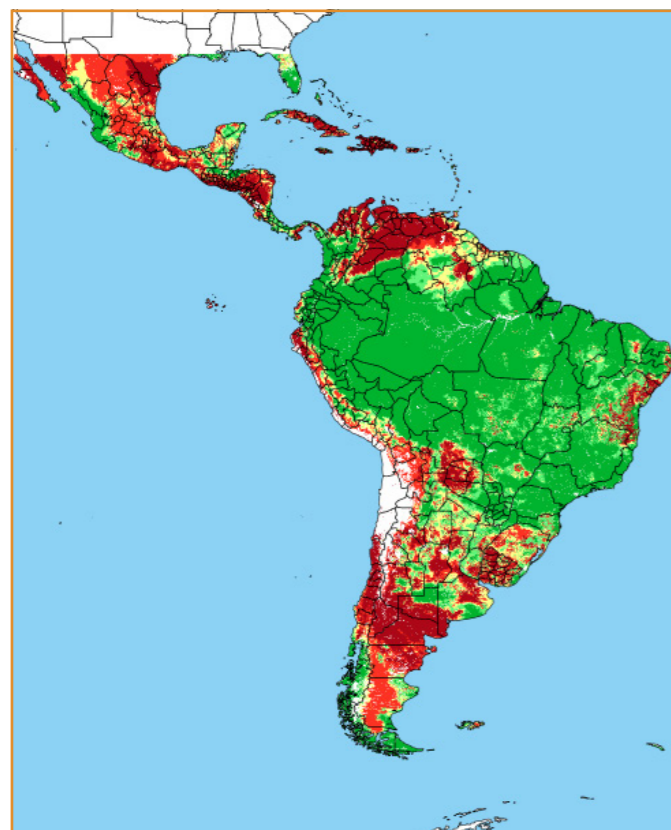
sábado, 1 de fevereiro



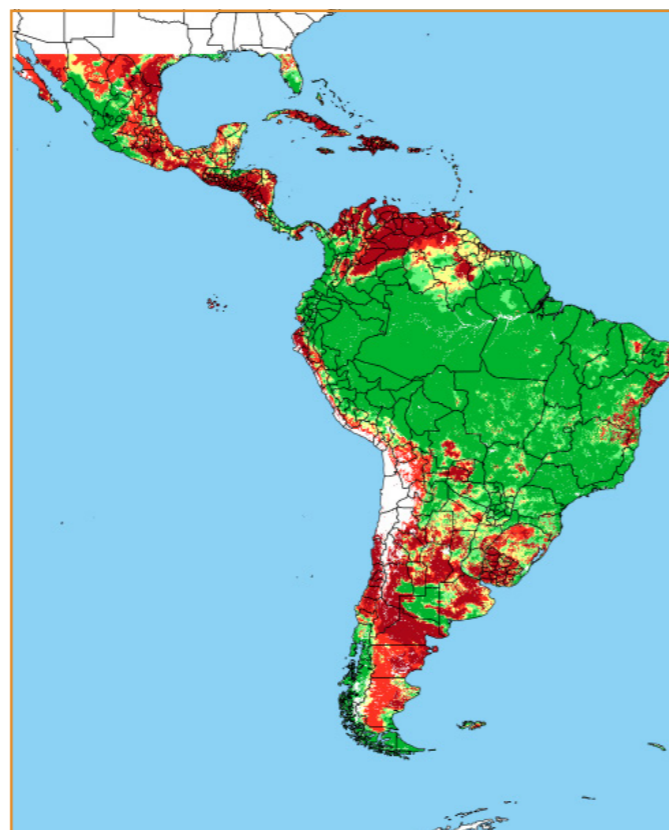
JANEIRO / 2020

D	S	T	Q	Q	S	S
			1	2	3	4
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19	20	21	22	23	24	25
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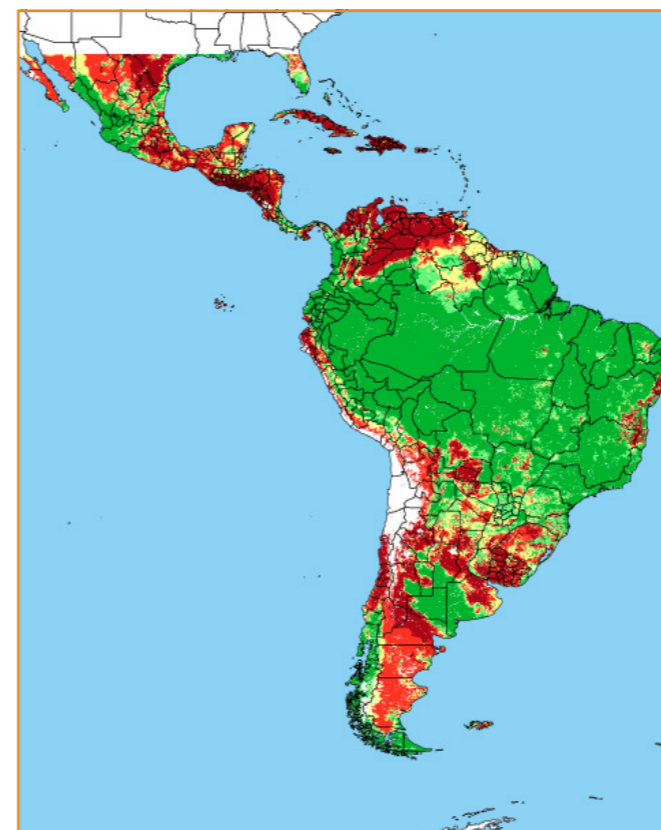
CALENDÁRIO JULIANO



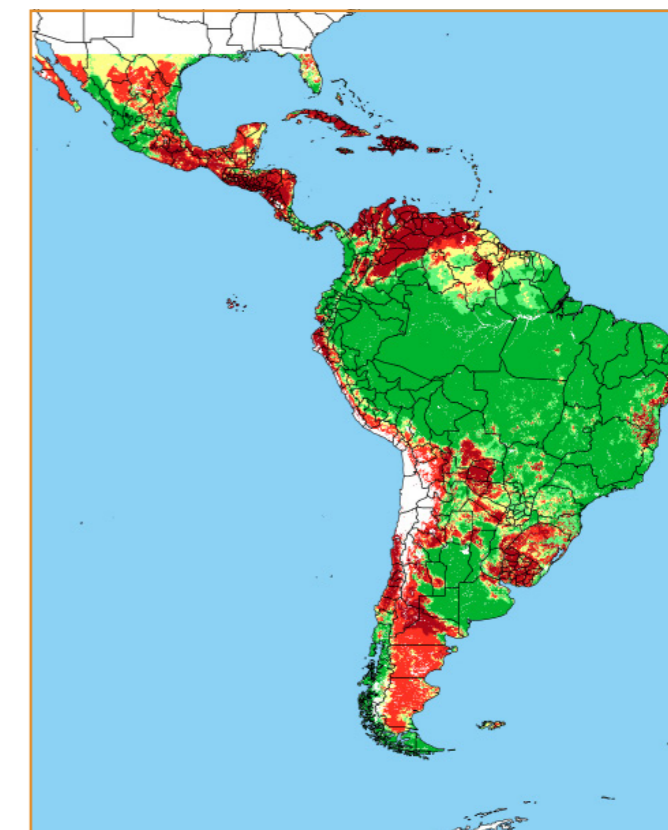
domingo, 2 de fevereiro



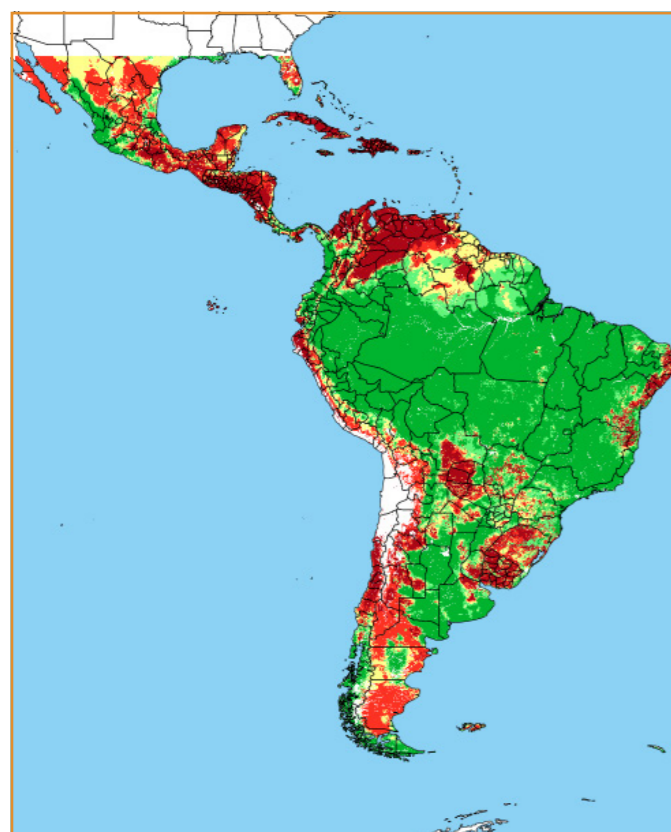
segunda-feira, 3 de fevereiro



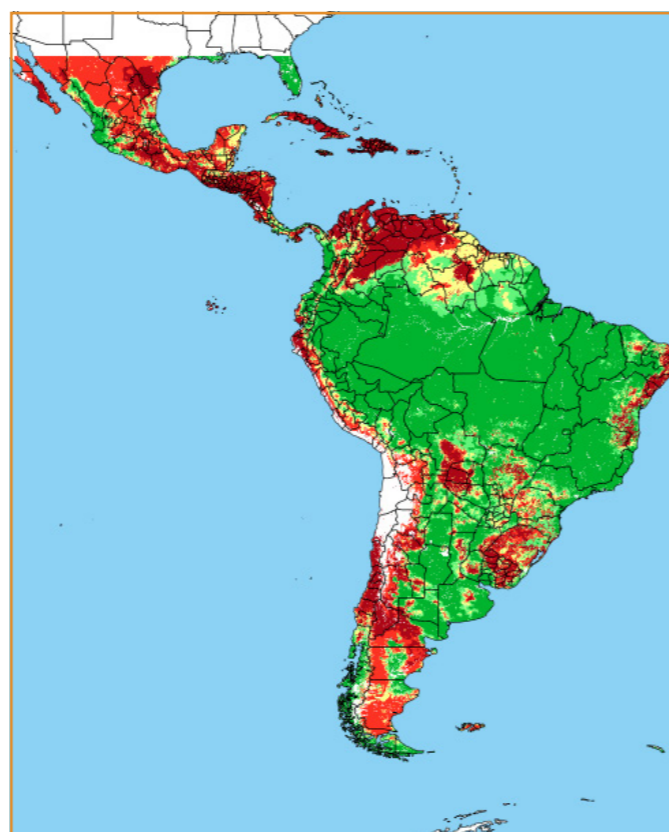
terça-feira, 4 de fevereiro



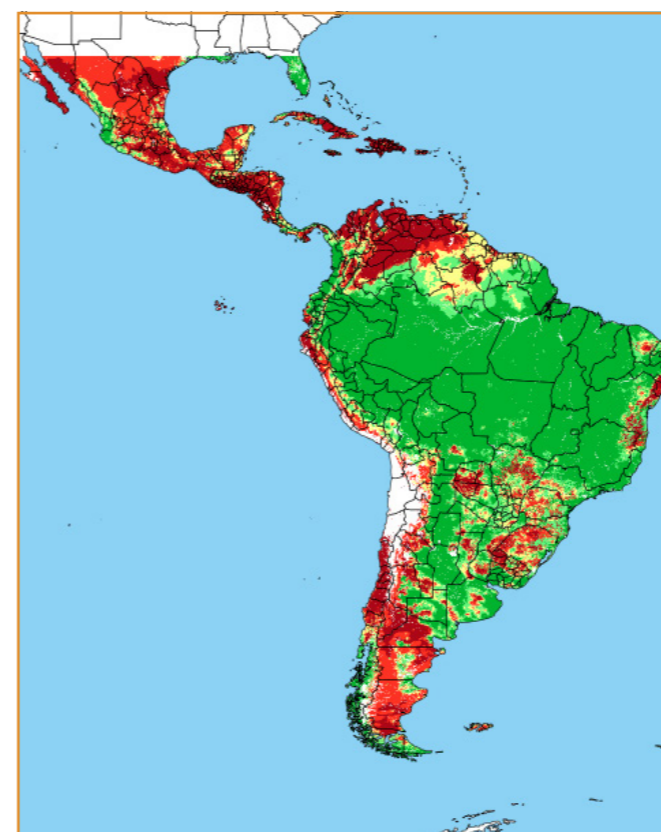
quarta-feira, 5 de fevereiro



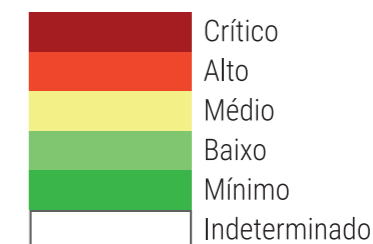
quinta-feira, 6 de fevereiro



sexta-feira, 7 de fevereiro

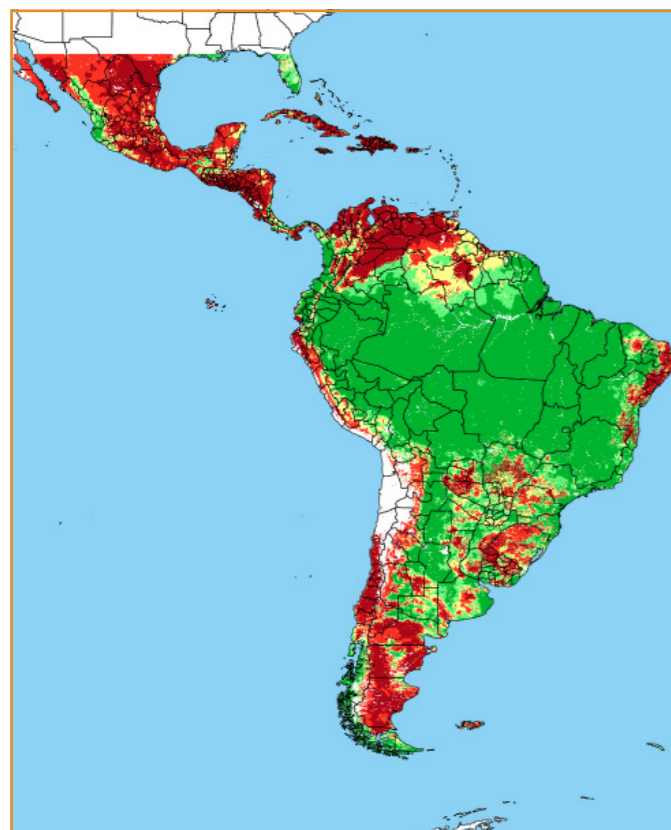


sábado, 8 de fevereiro

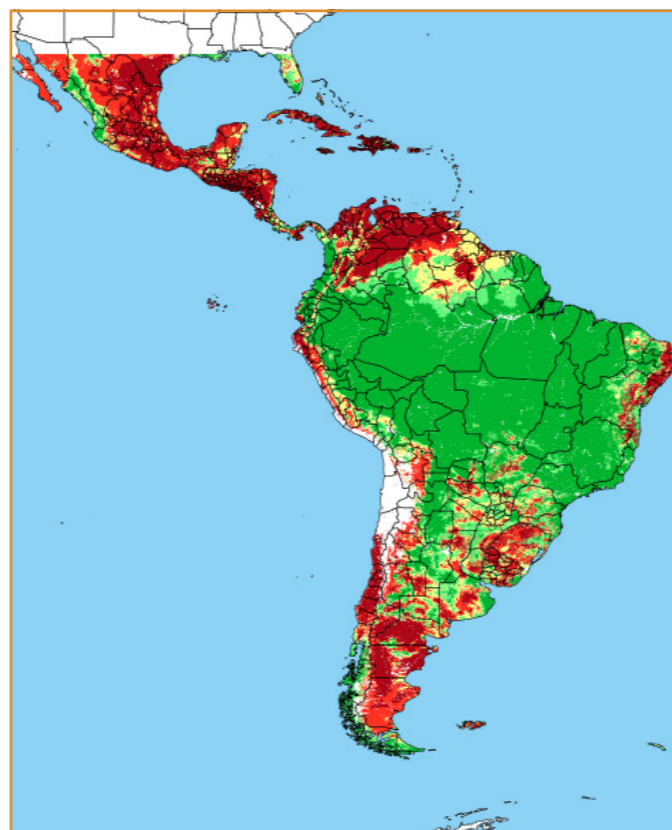


FEVEREIRO / 2020						
D	S	T	Q	Q	S	S
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54	55	56	57	58	59	60

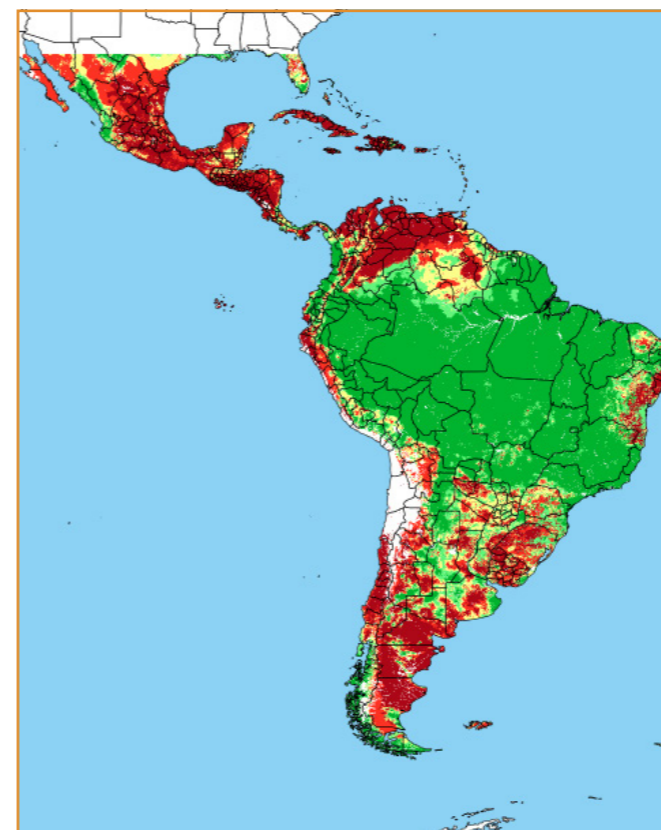
CALENDÁRIO JULIANO



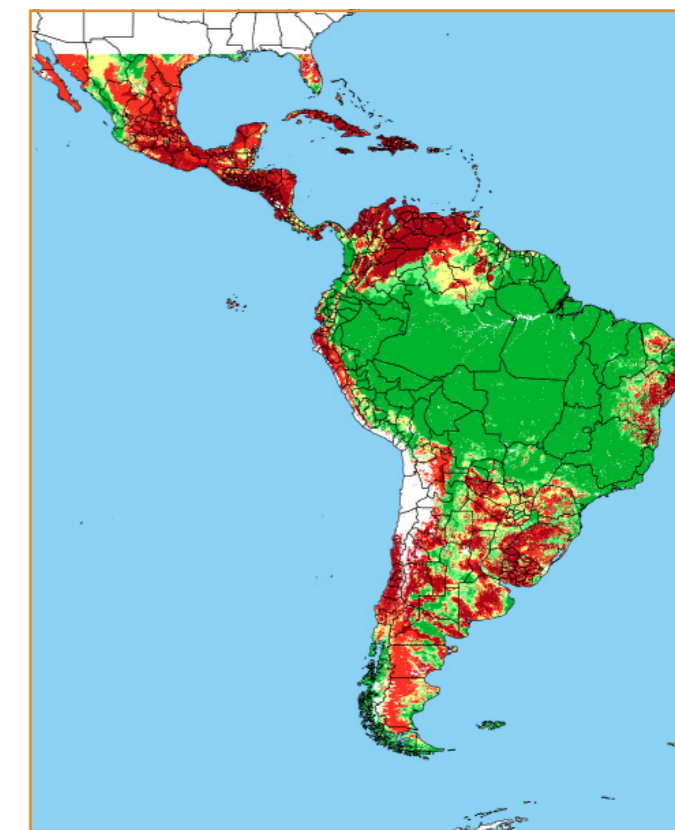
domingo, 9 de fevereiro



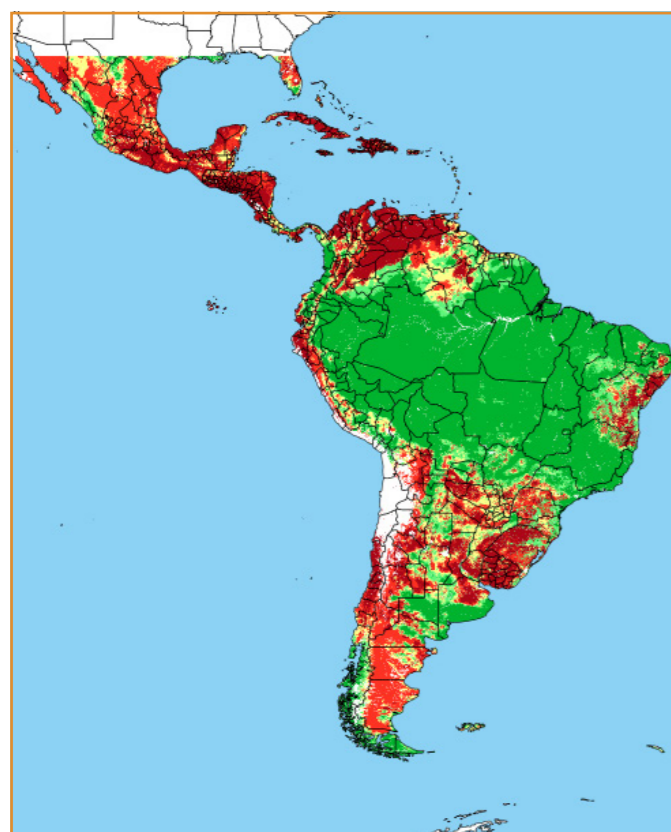
segunda-feira, 10 de fevereiro



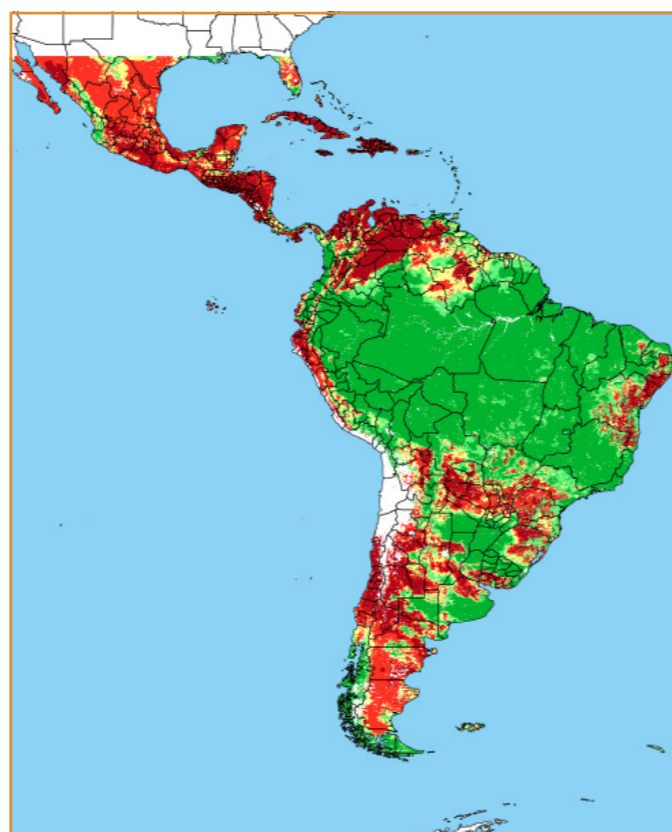
terça-feira, 11 de fevereiro



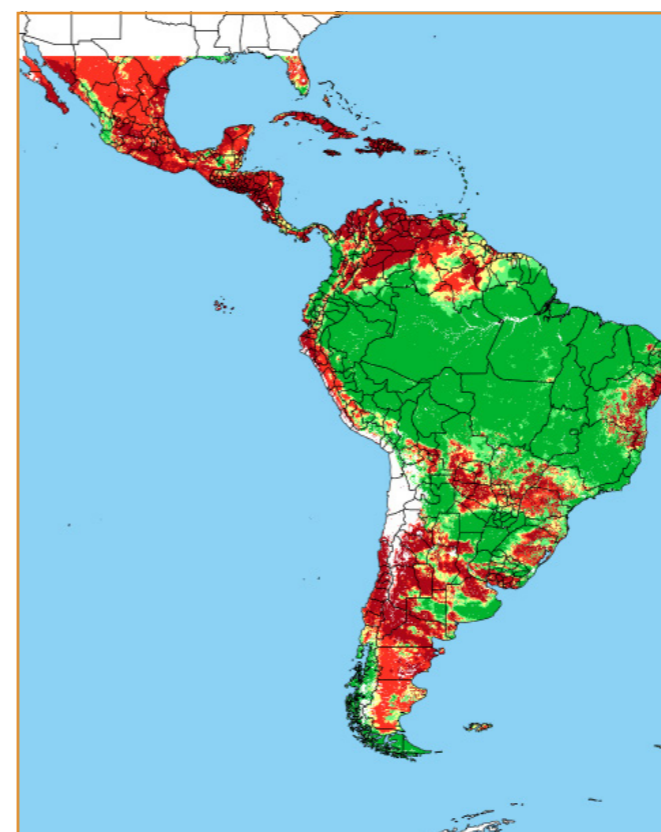
quarta-feira, 12 de fevereiro



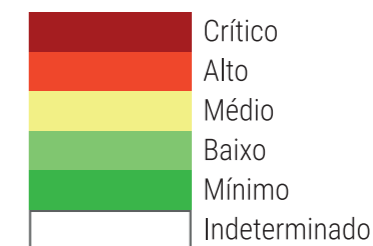
quinta-feira, 13 de fevereiro



sexta-feira, 14 de fevereiro

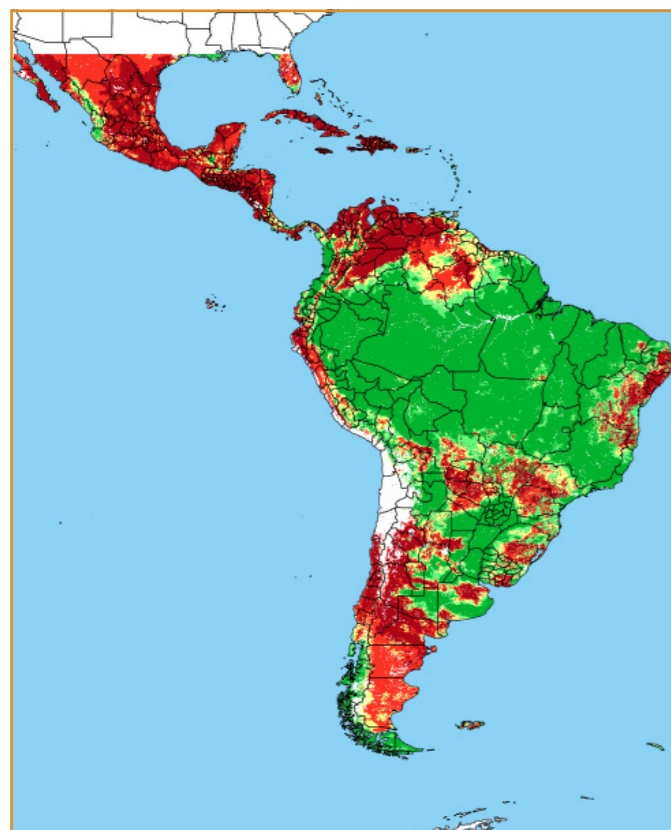


sábado, 15 de fevereiro

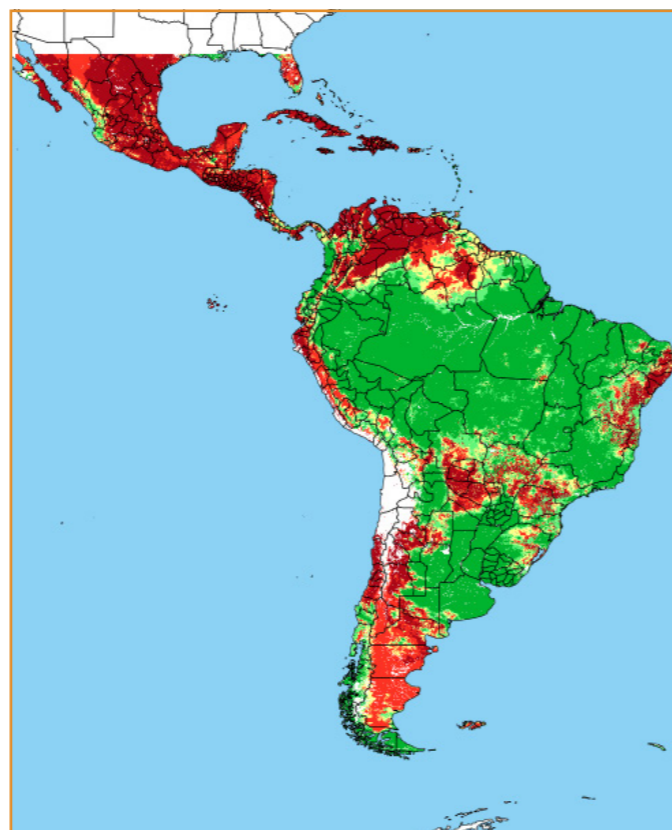


FEVEREIRO / 2020						
D	S	T	Q	Q	S	S
						32
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40	41	42	43	44	45	46
47	48	49	50	51	52	53
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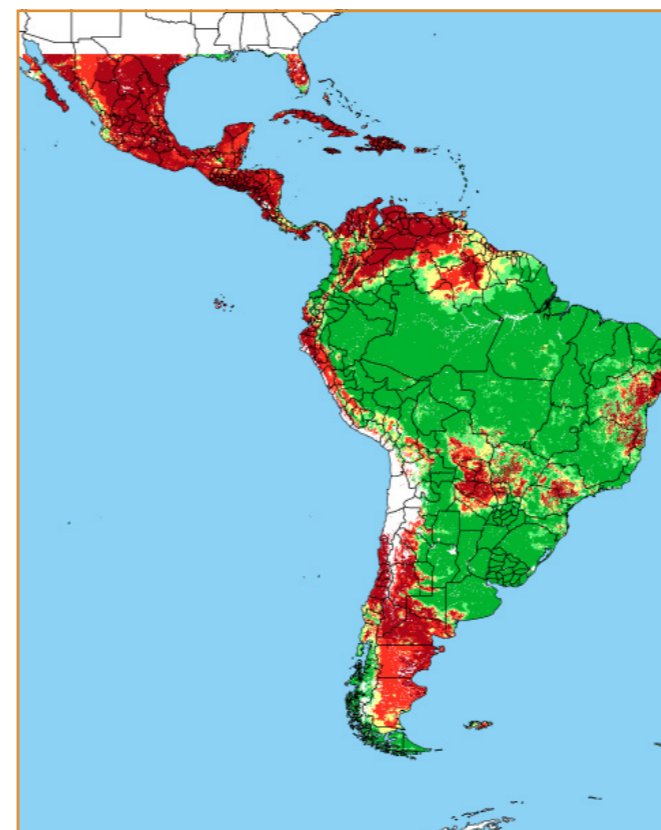
CALENDÁRIO JULIANO



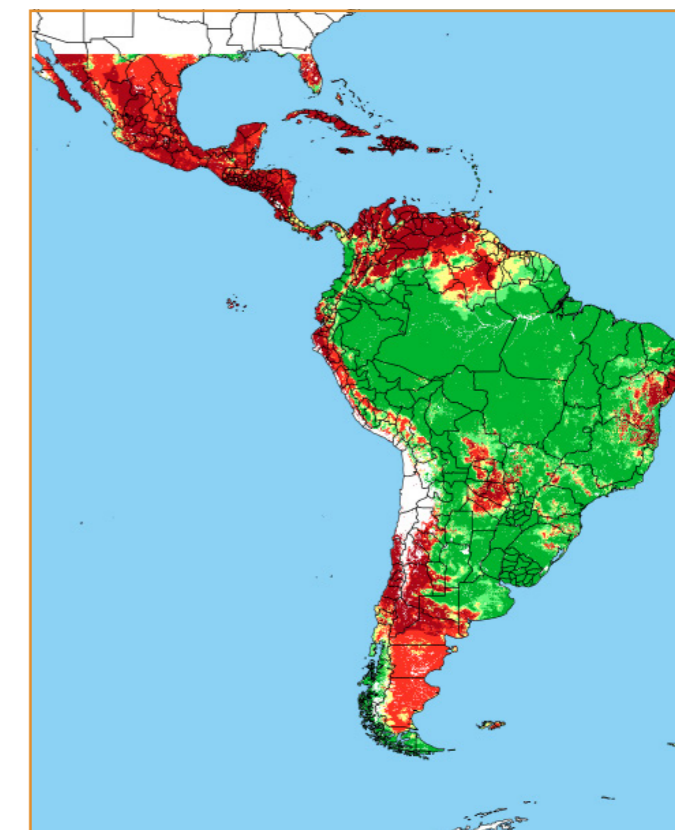
domingo, 16 de fevereiro



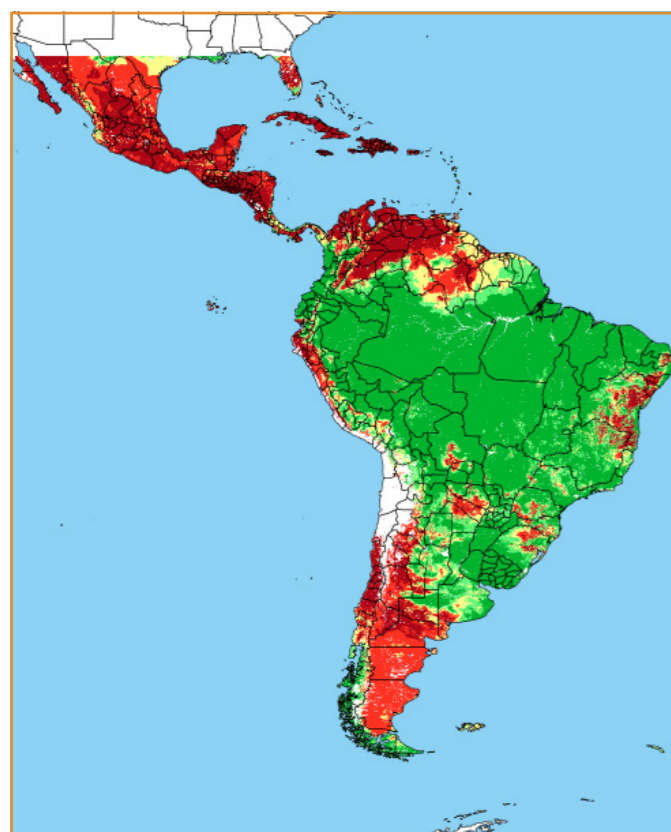
segunda-feira, 17 de fevereiro



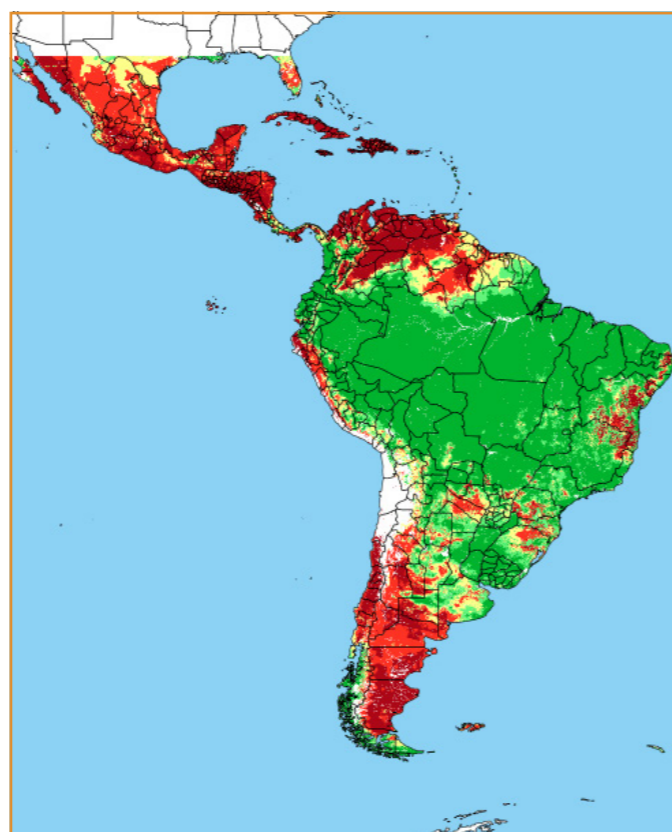
terça-feira, 18 de fevereiro



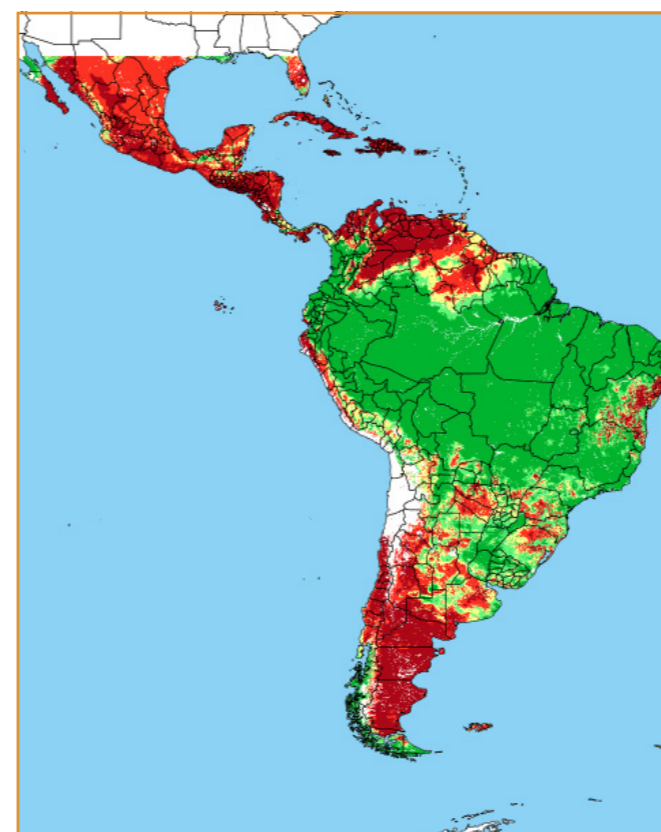
quarta-feira, 19 de fevereiro



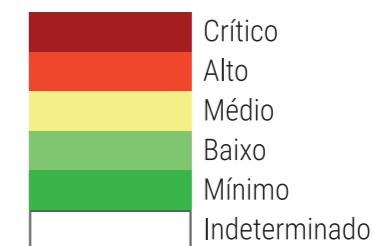
quinta-feira, 20 de fevereiro



sexta-feira, 21 de fevereiro

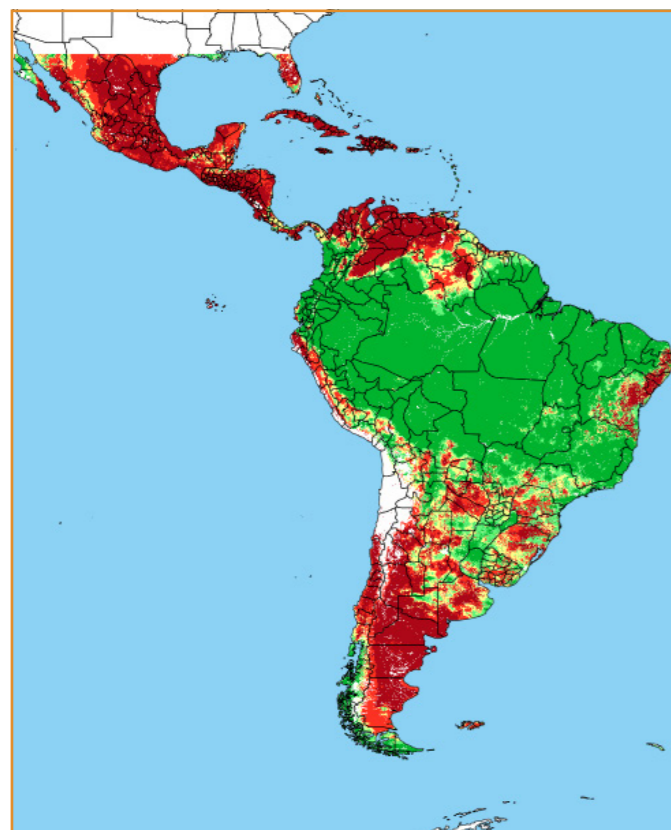


sábado, 22 de fevereiro

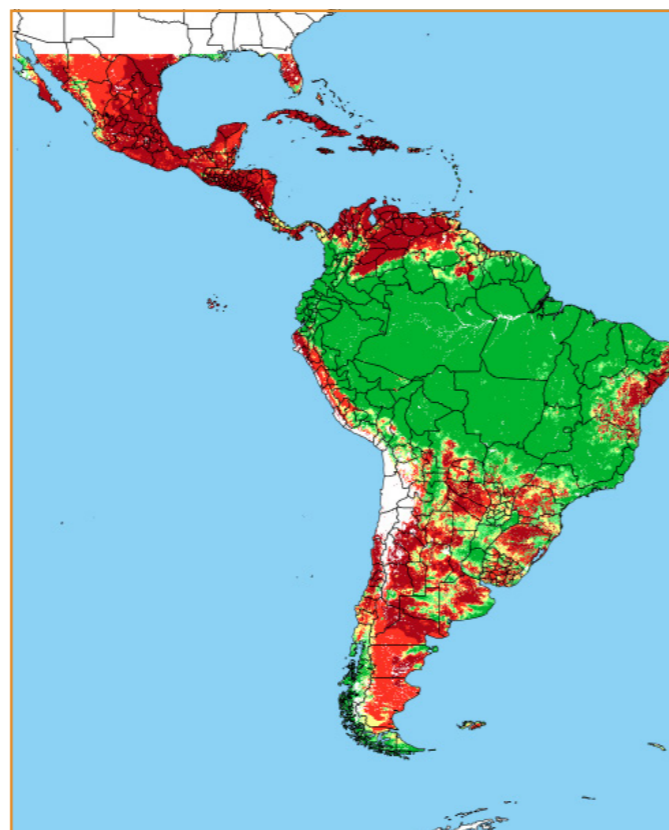


FEVEREIRO / 2020						
D	S	T	Q	Q	S	S
						32
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40	41	42	43	44	45	46
47	48	49	50	51	52	53
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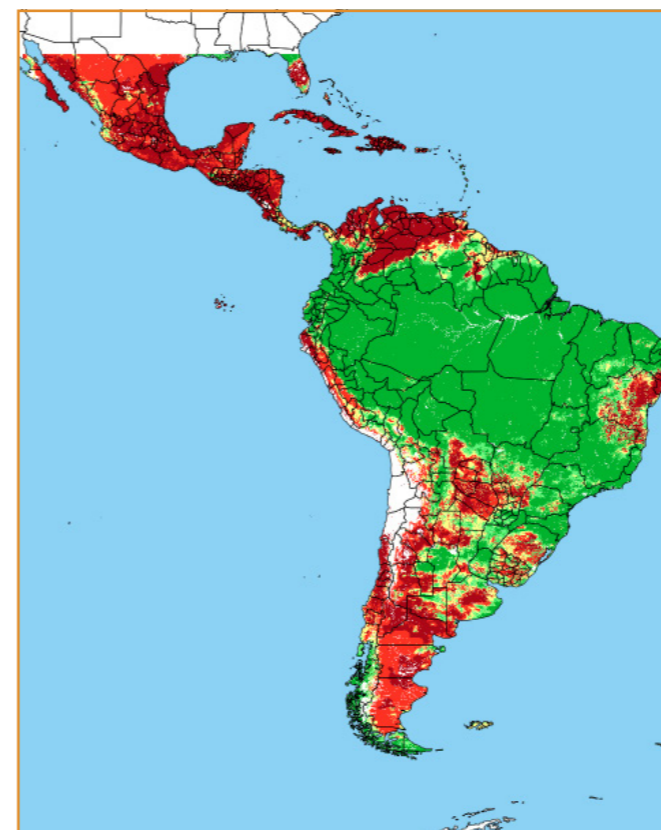
CALENDÁRIO JULIANO



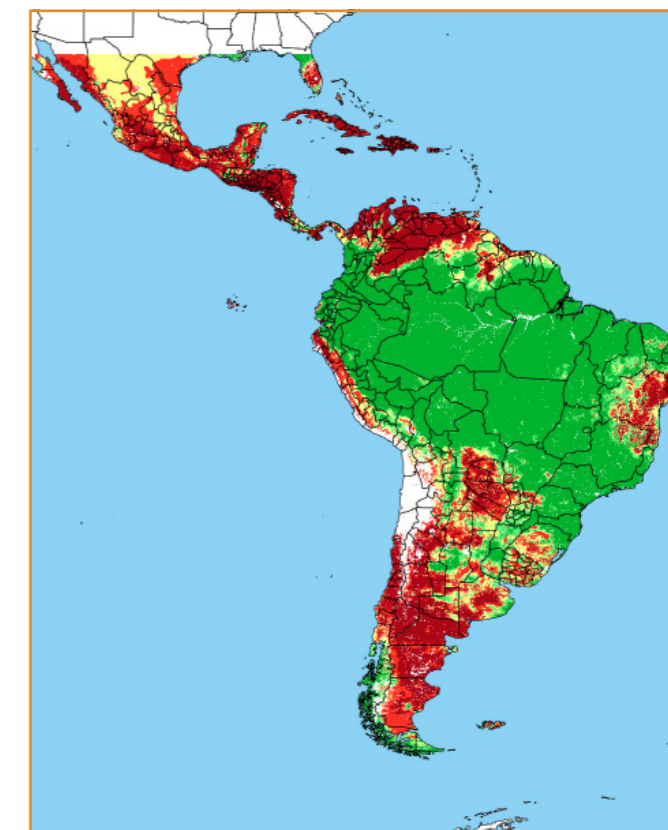
domingo, 23 de fevereiro



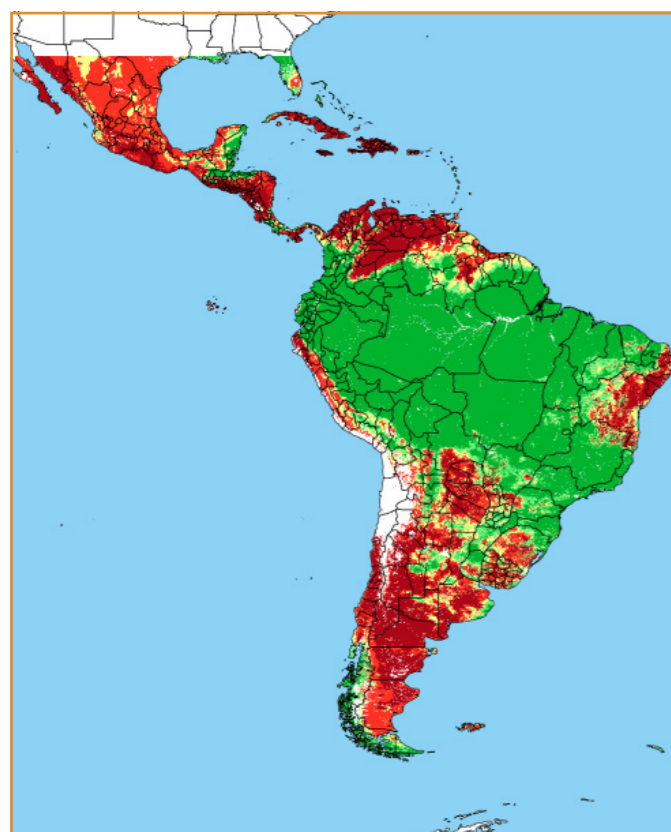
segunda-feira, 24 de fevereiro



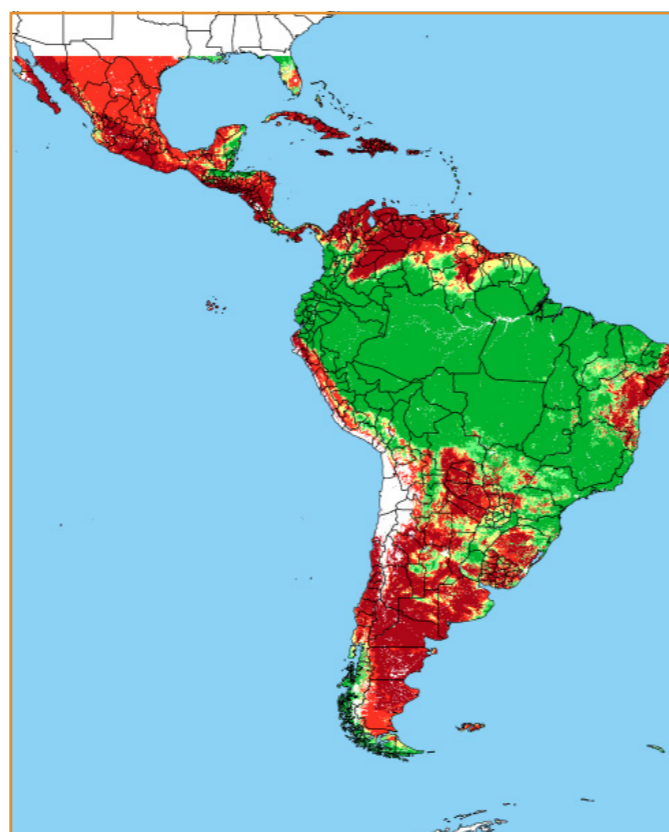
terça-feira, 25 de fevereiro



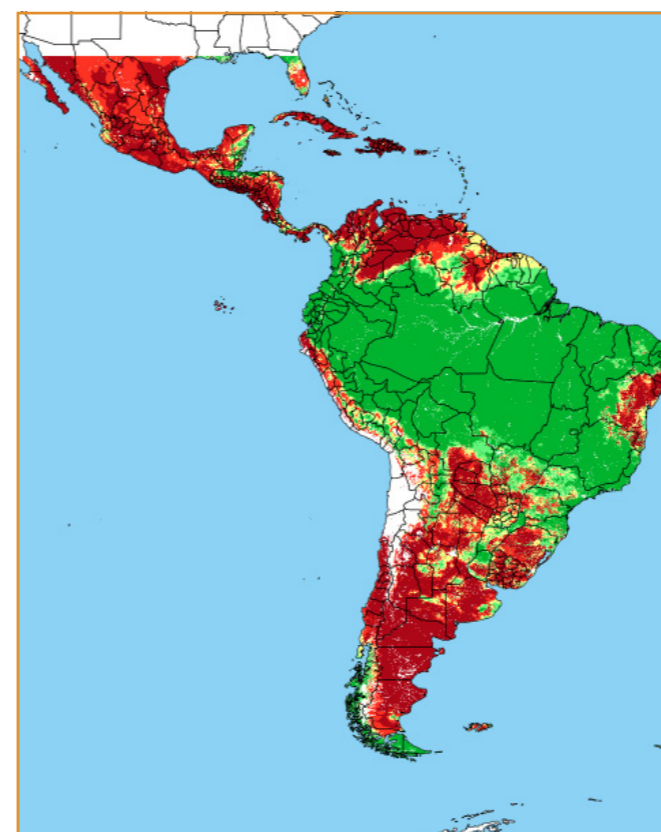
quarta-feira, 26 de fevereiro



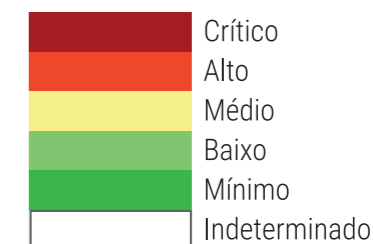
quinta-feira, 27 de fevereiro



sexta-feira, 28 de fevereiro

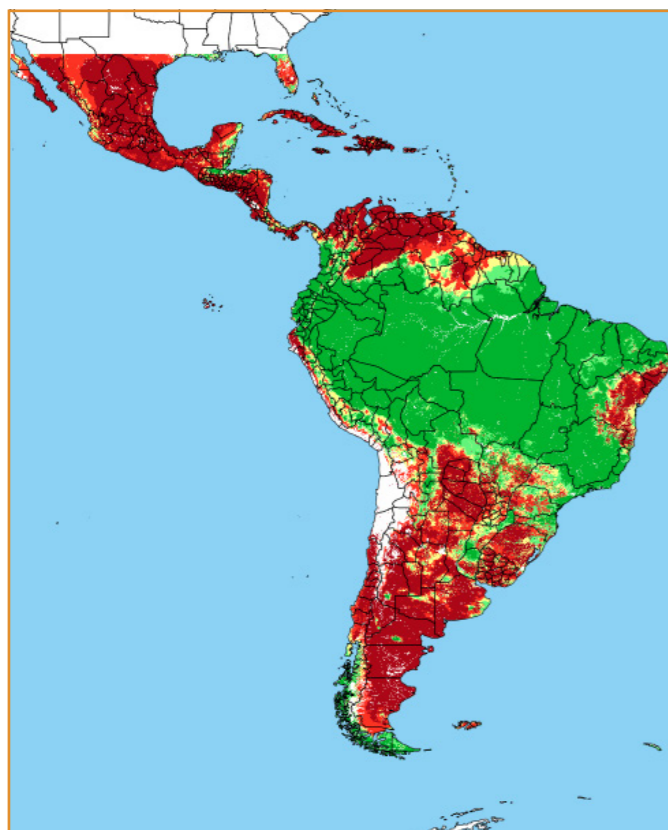


sábado, 29 de fevereiro

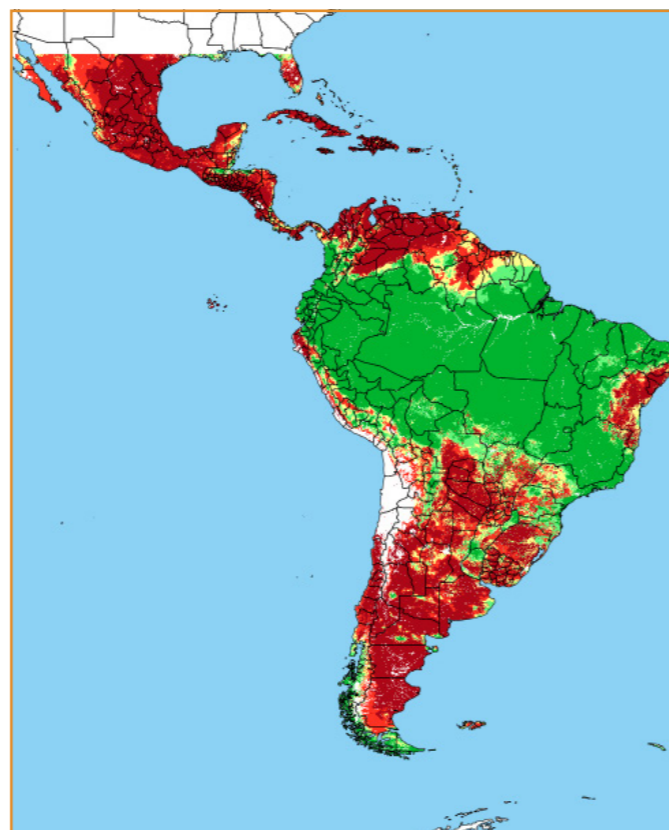


FEVEREIRO / 2020						
D	S	T	Q	Q	S	S
						32
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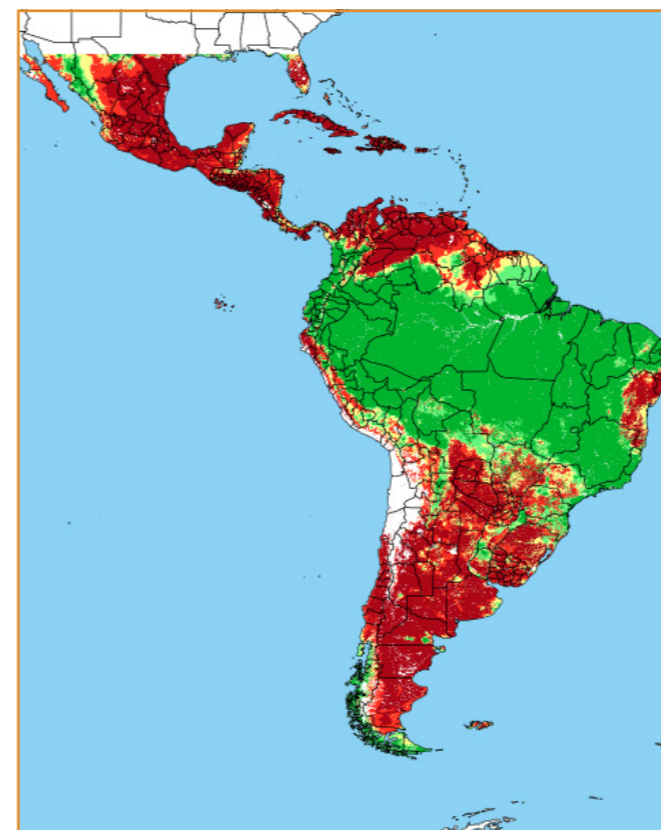
CALENDÁRIO JULIANO



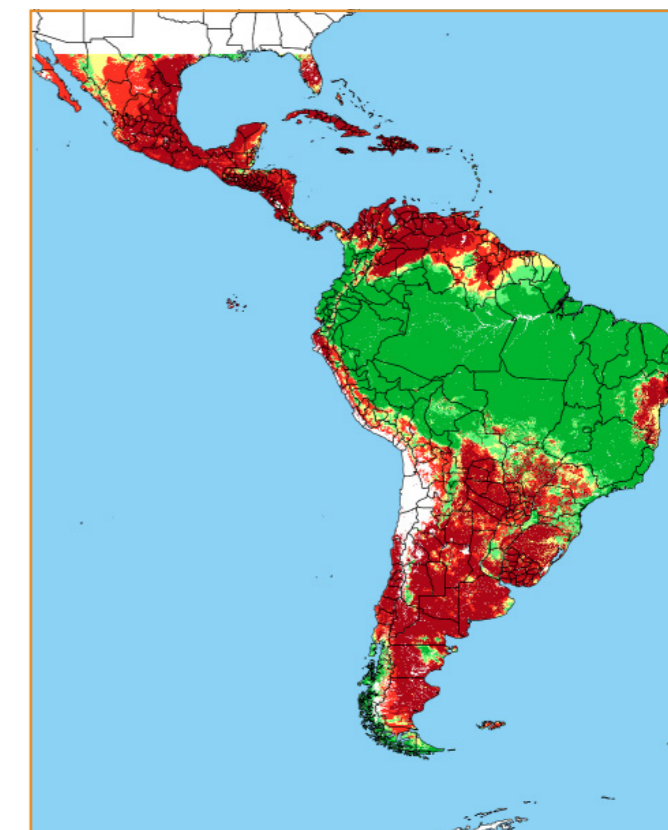
domingo, 1 de março



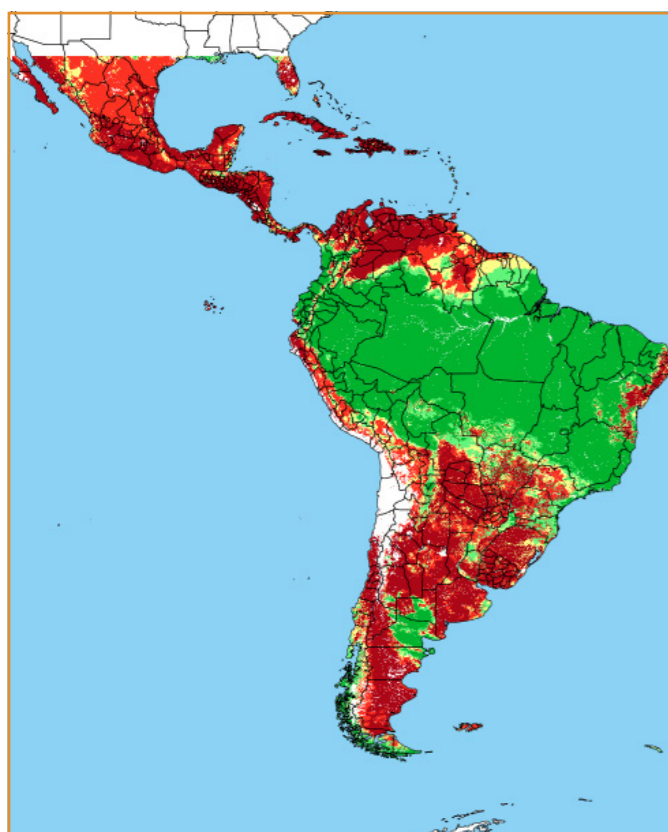
segunda-feira, 2 de março



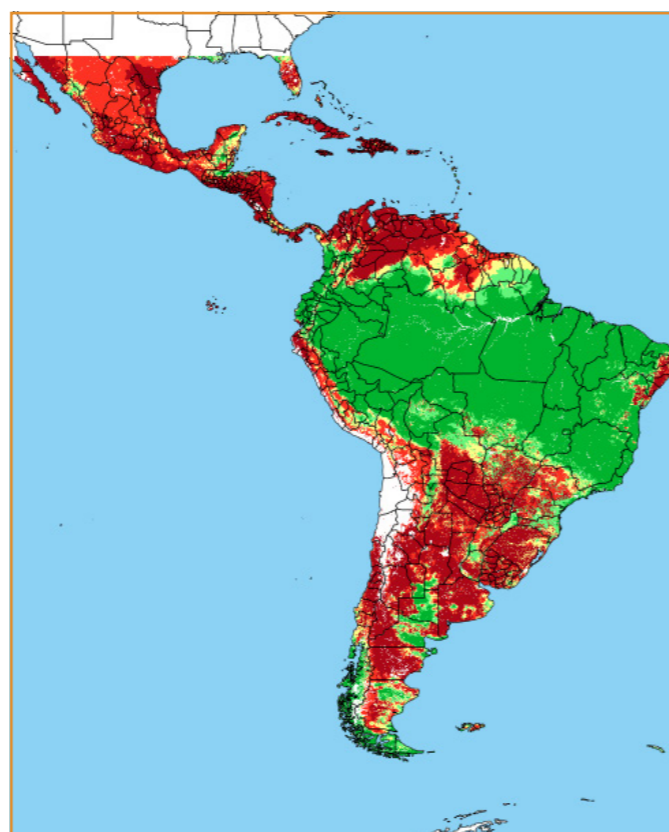
terça-feira, 3 de março



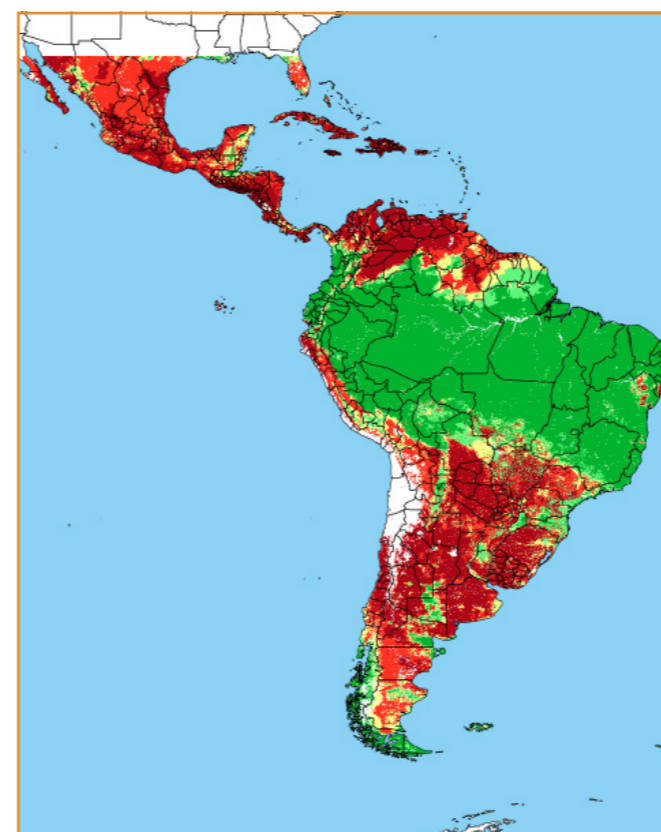
quarta-feira, 4 de março



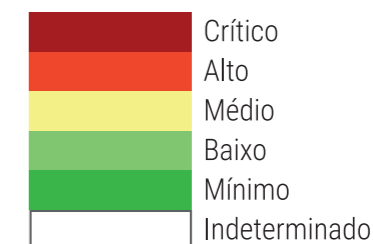
quinta-feira, 5 de março



sexta-feira, 6 de março



sábado, 7 de março

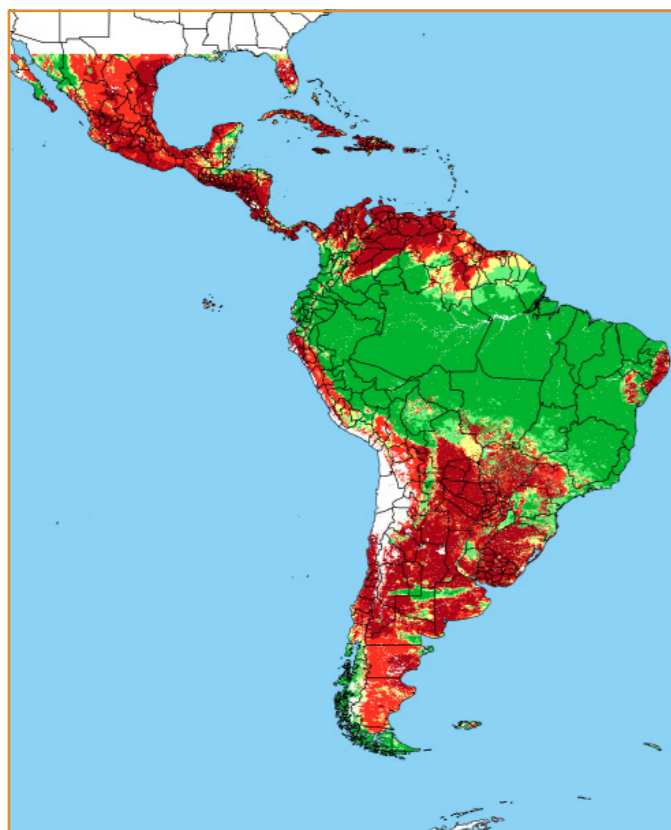


MARÇO / 2020

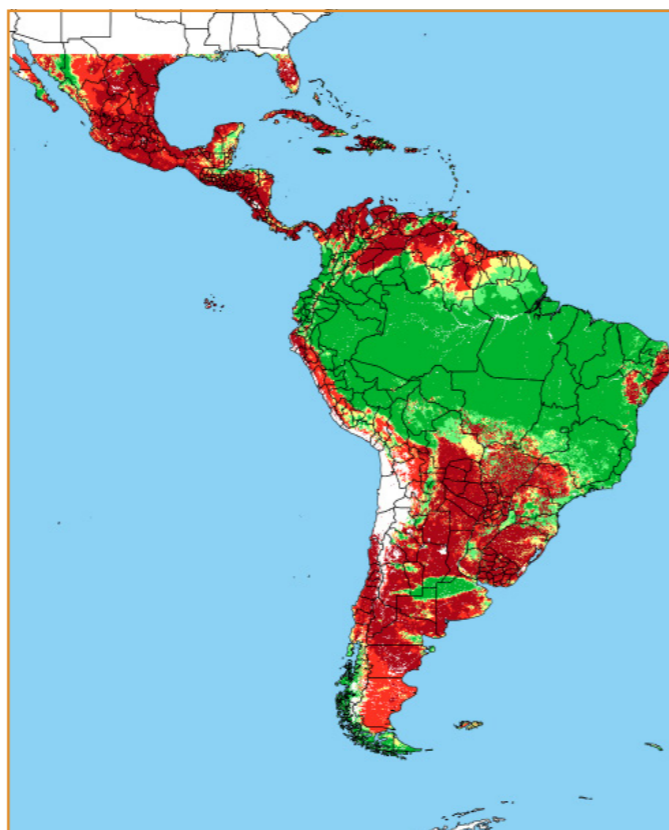
D	S	T	Q	Q	S	S
61	62	63	64	65	66	67
68	69	70	71	72	73	74
75	76	77	78	79	80	81
82	83	84	85	86	87	88
89	90	91				

CALENDÁRIO JULIANO

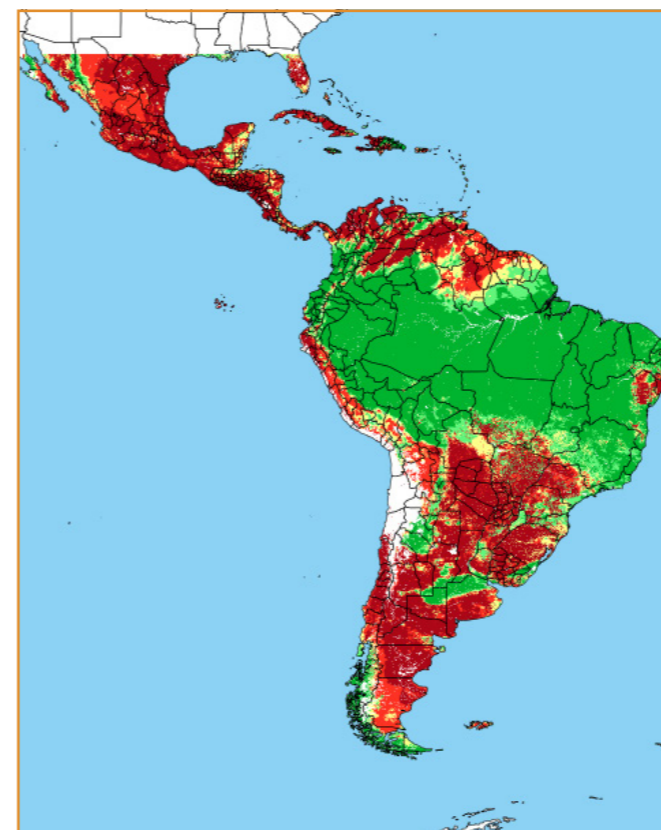




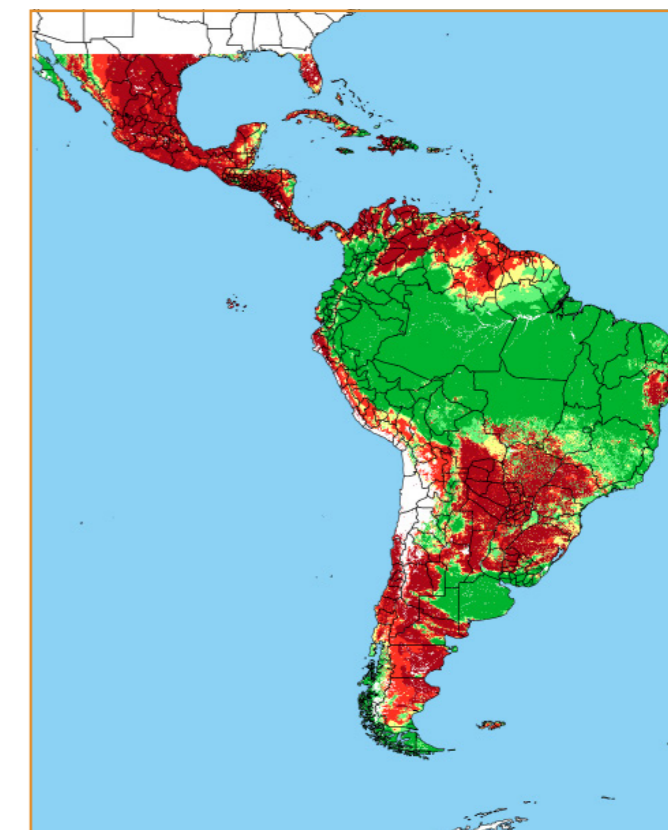
domingo, 8 de março



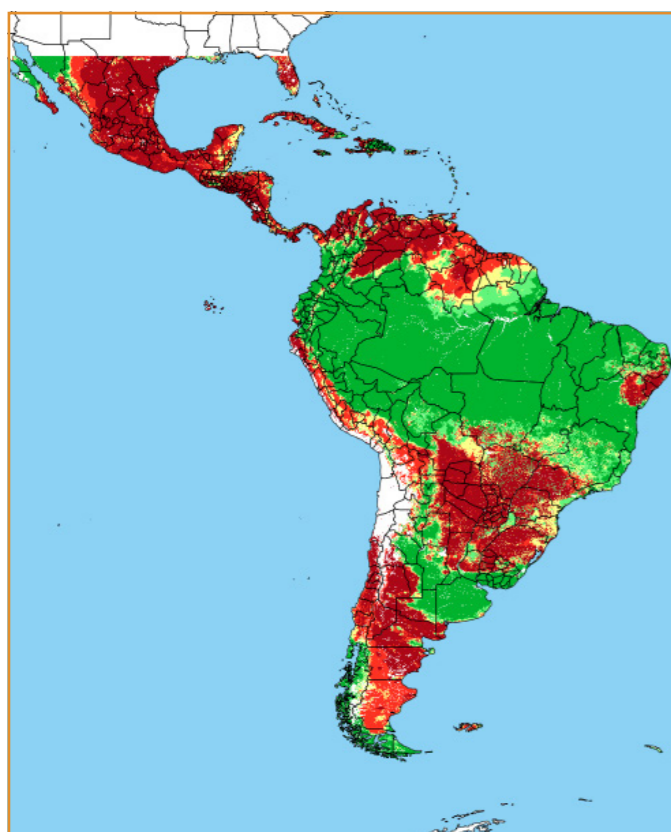
segunda-feira, 9 de março



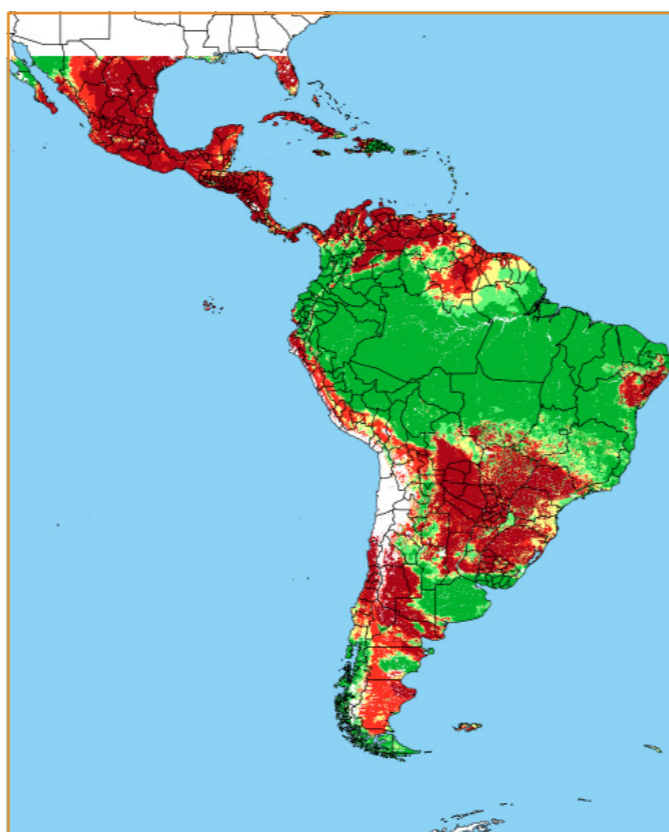
terça-feira, 10 de março



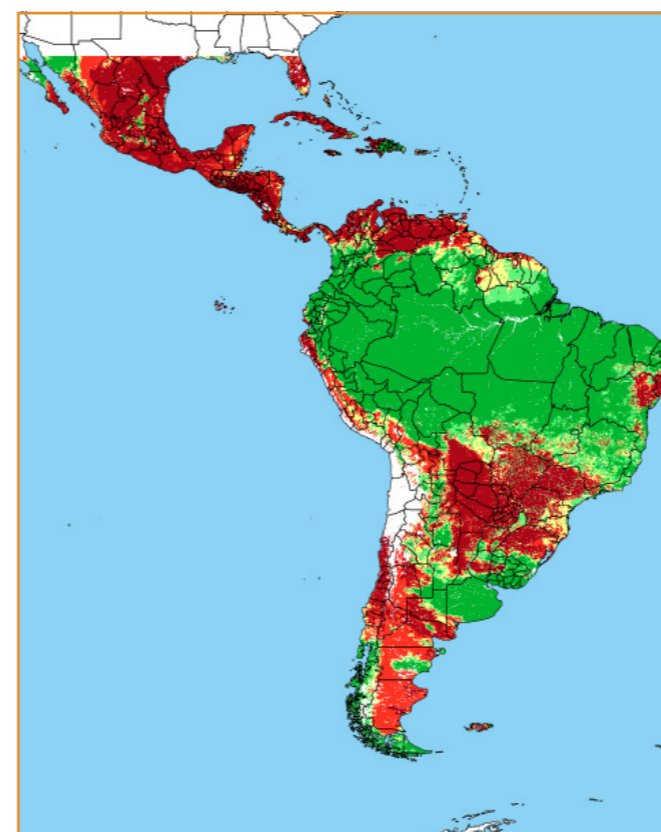
quarta-feira, 11 de março



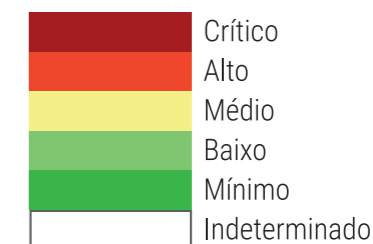
quinta-feira, 12 de março



sexta-feira, 13 de março



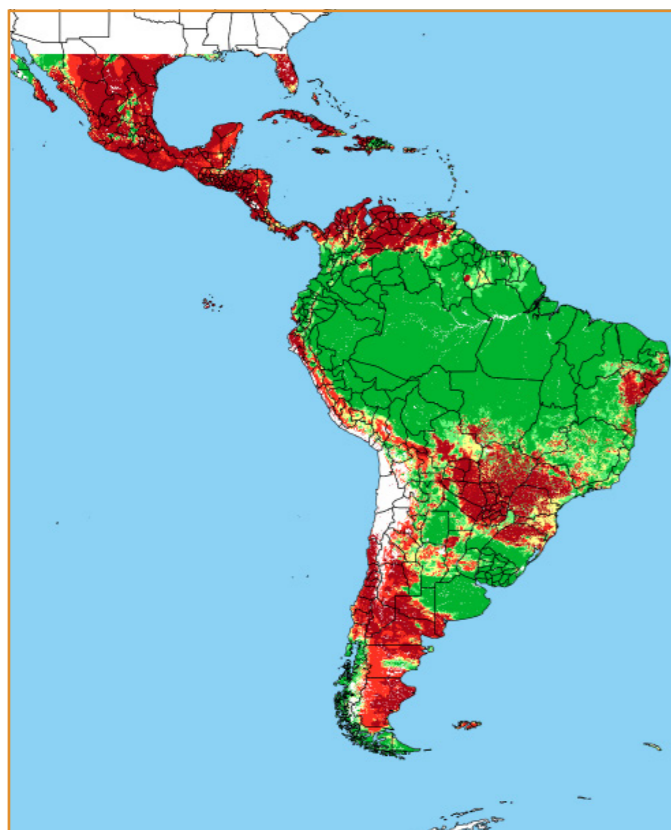
sábado, 14 de março



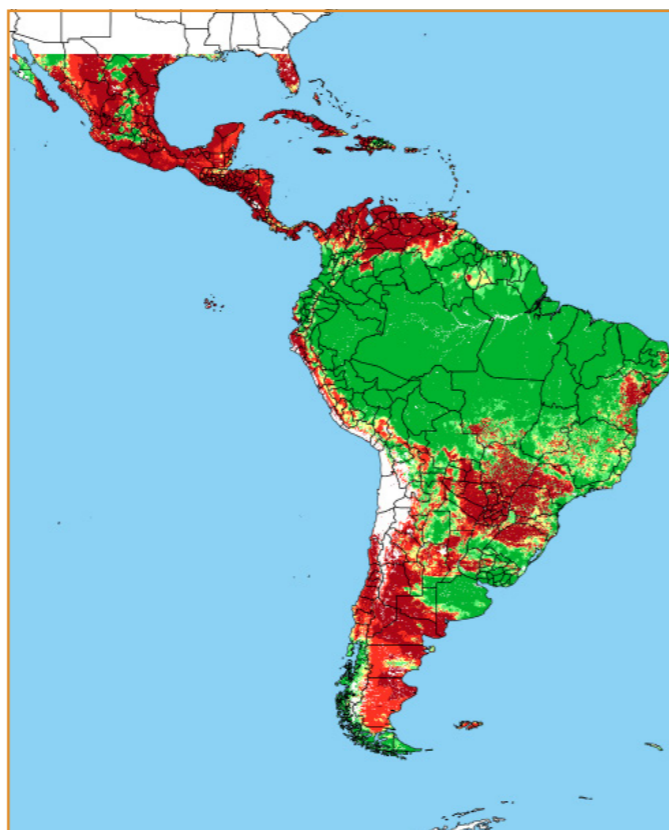
MARÇO / 2020

D	S	T	Q	Q	S	S
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82	83	84	85	86	87	88
89	90	91				

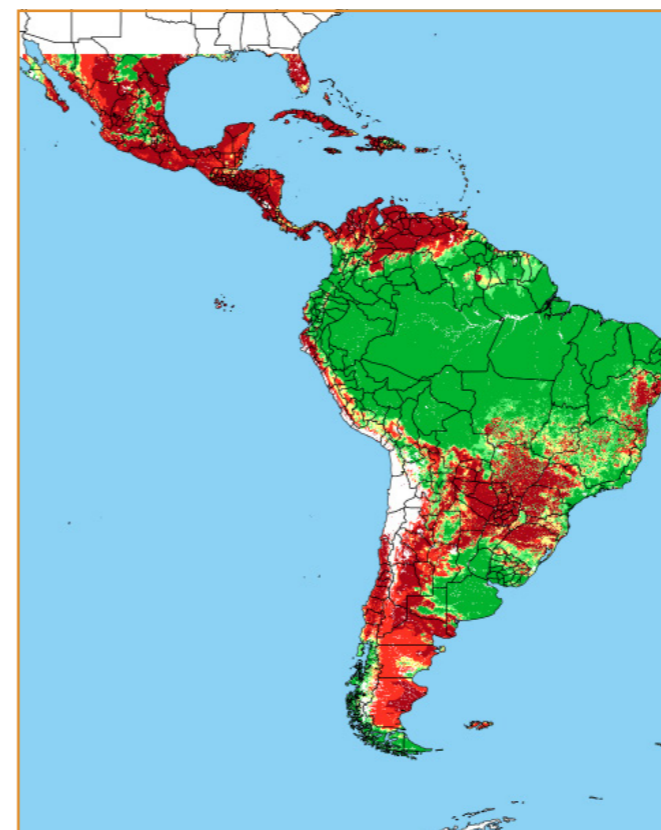
CALENDÁRIO JULIANO



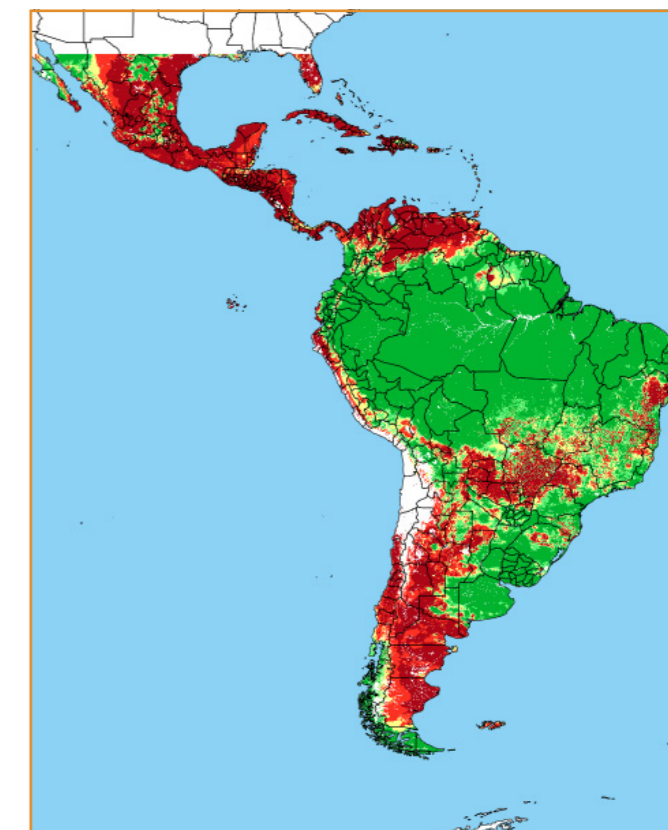
domingo, 15 de março



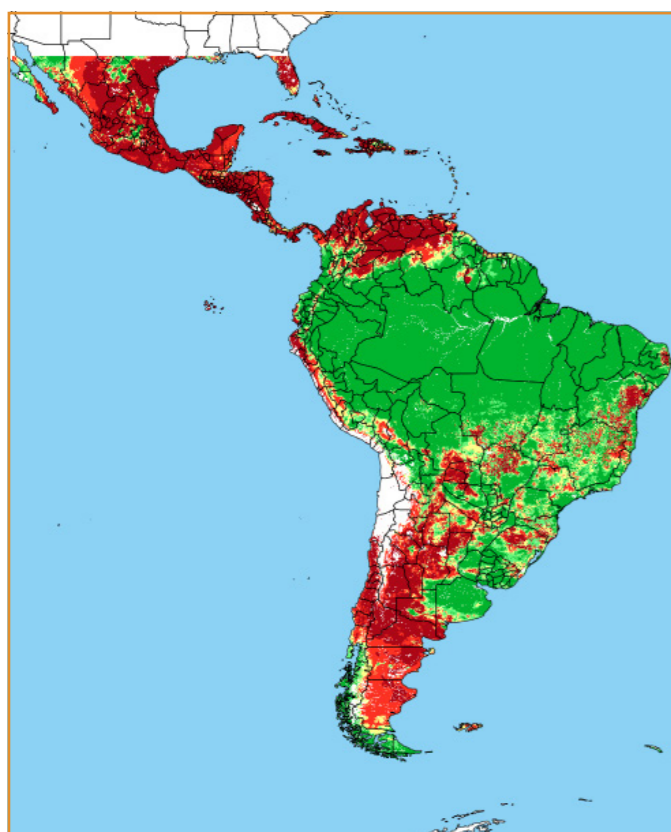
segunda-feira, 16 de março



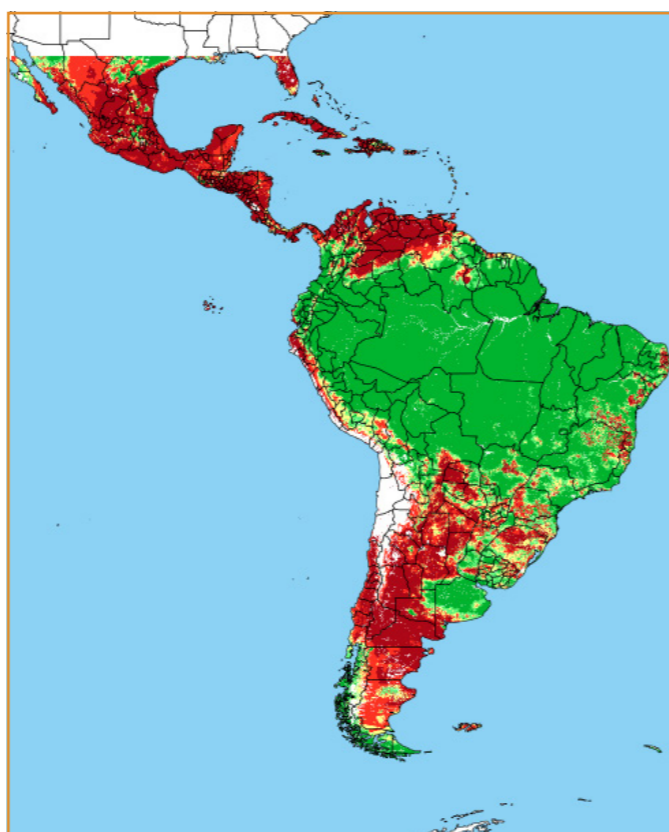
terça-feira, 17 de março



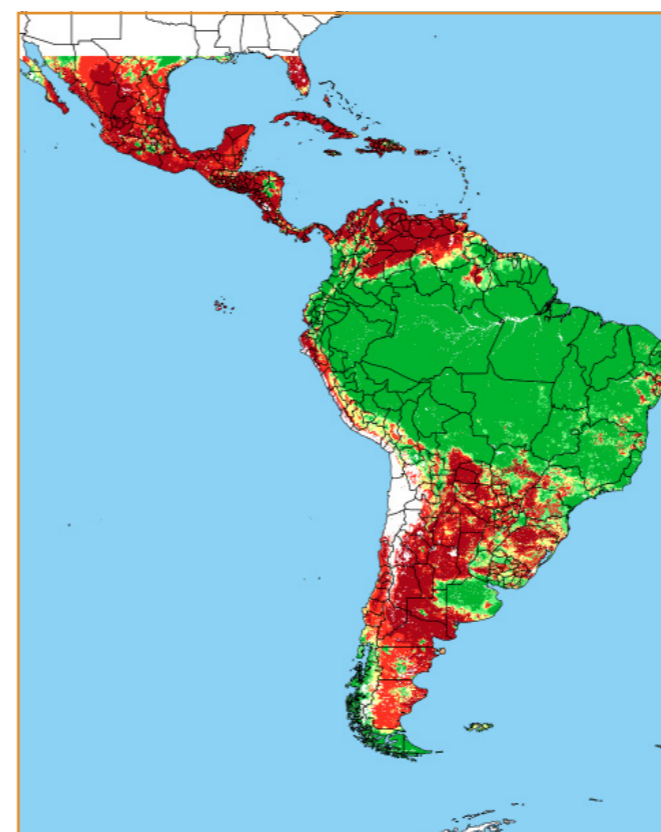
quarta-feira, 18 de março



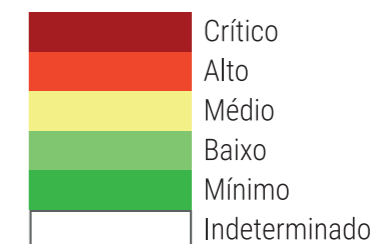
quinta-feira, 19 de março



sexta-feira, 20 de março



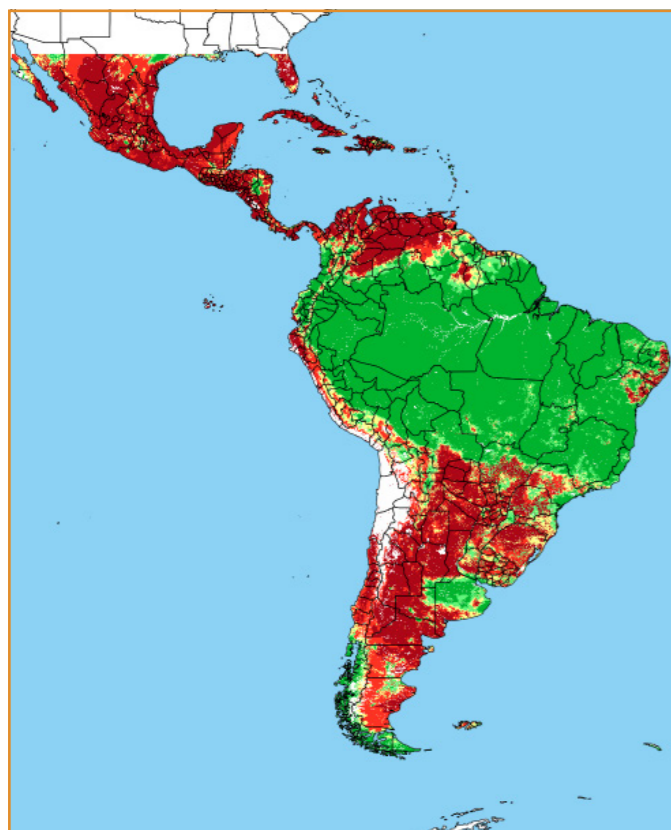
sábado, 21 de março



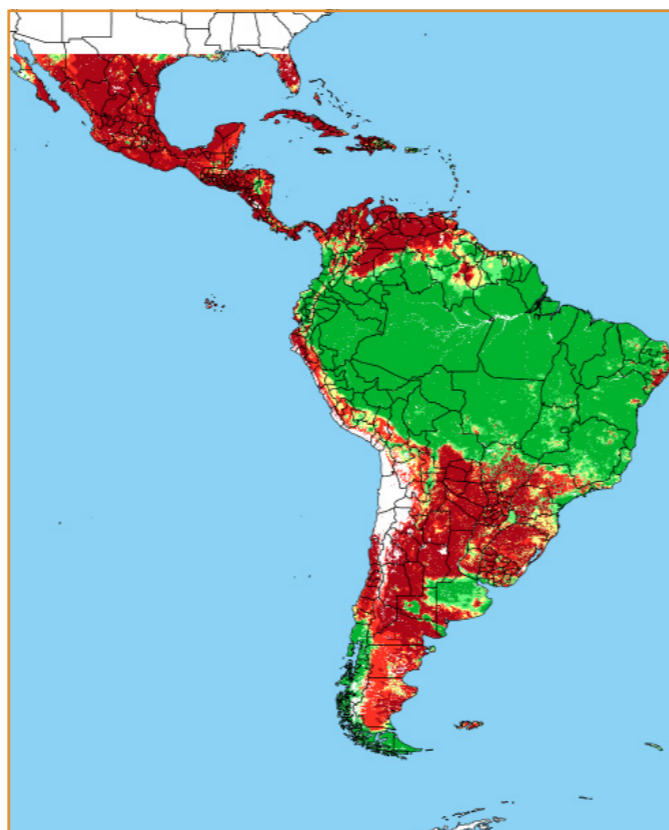
MARÇO / 2020

D	S	T	Q	Q	S	S
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75	76	77	78	79	80	81
82	83	84	85	86	87	88
89	90	91				

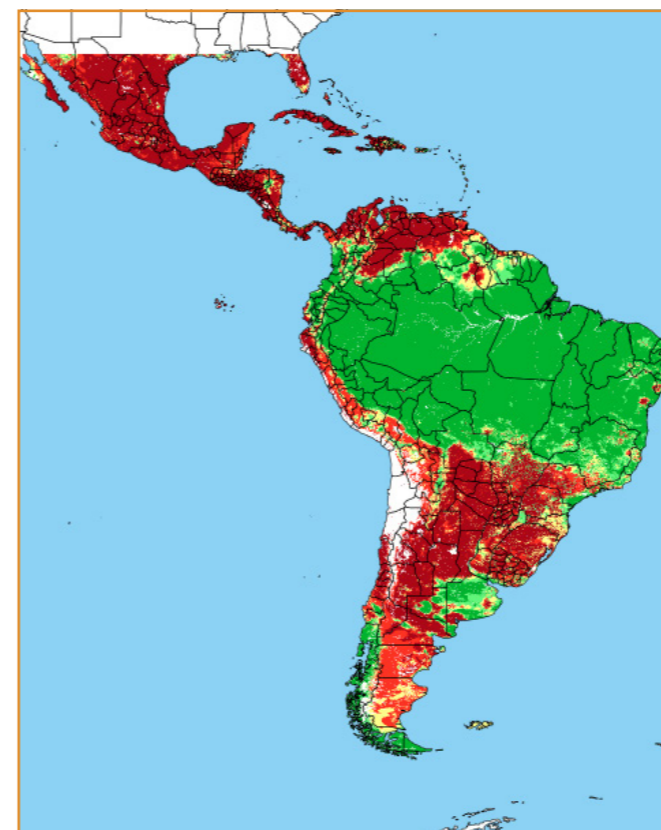
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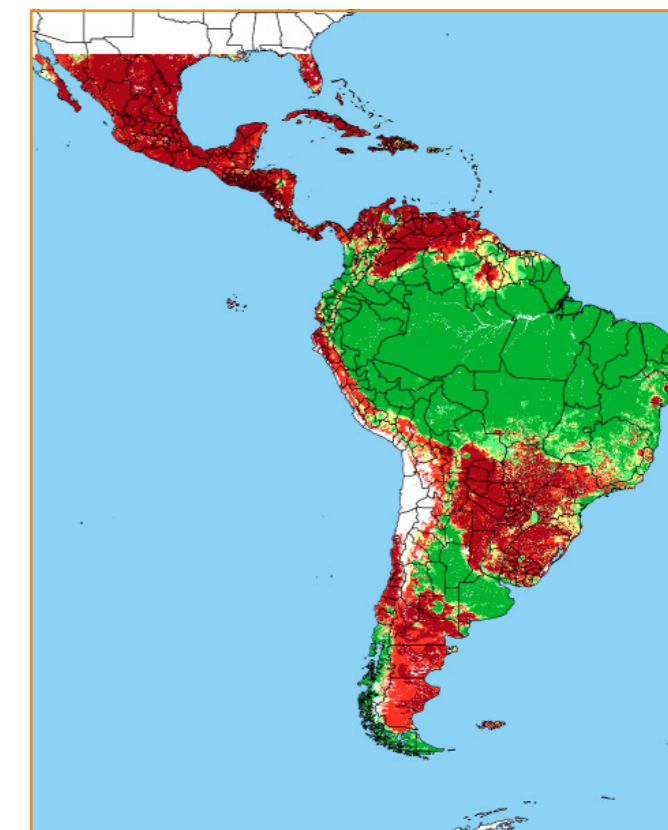
domingo, 22 de março



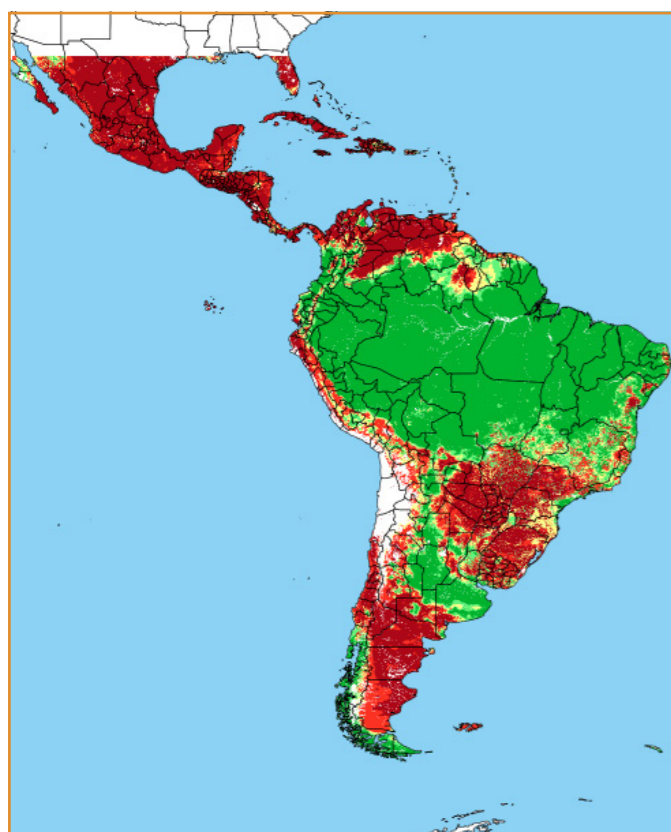
segunda-feira, 23 de março



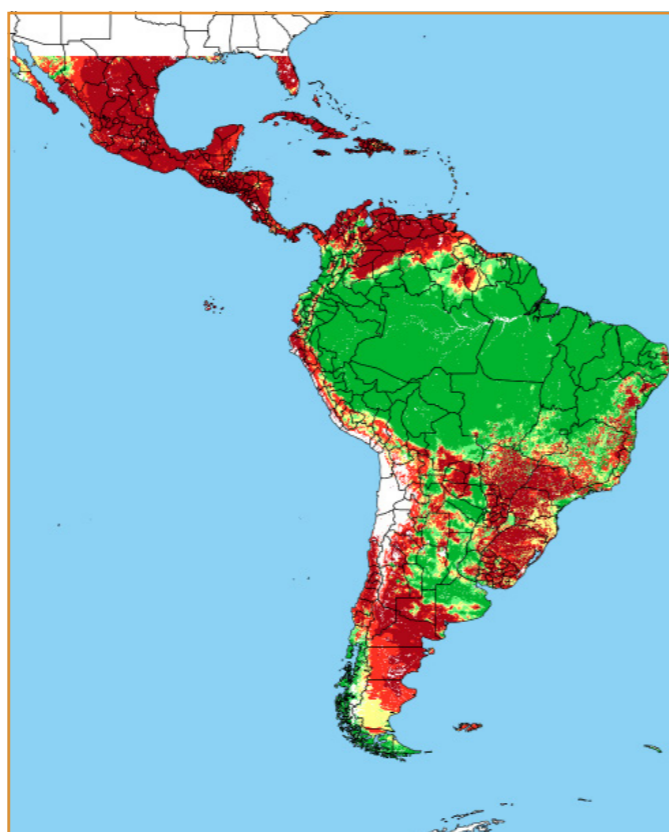
terça-feira, 24 de março



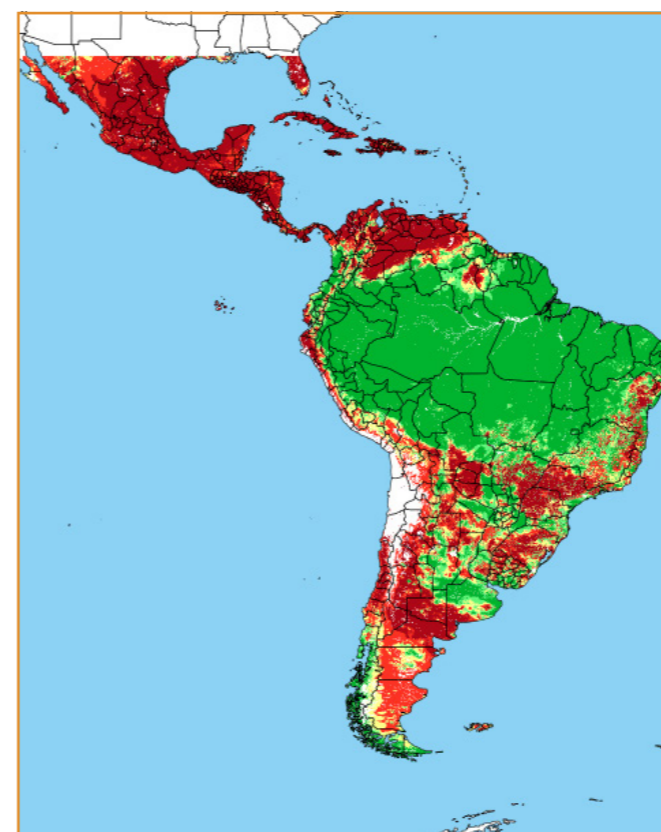
quarta-feira, 25 de março



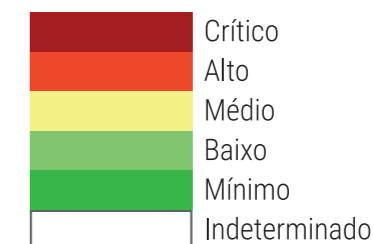
quinta-feira, 26 de março



sexta-feira, 27 de março



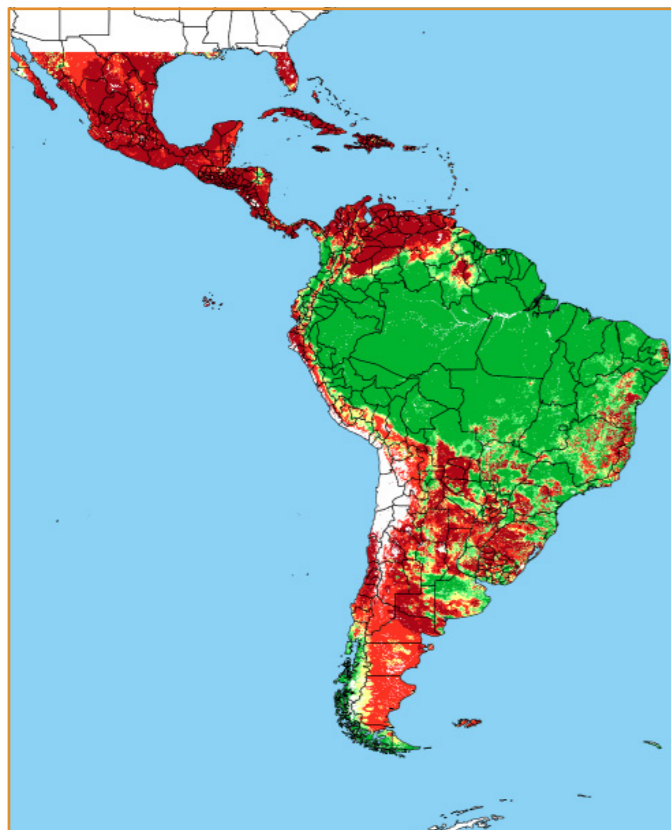
sábado, 28 de março



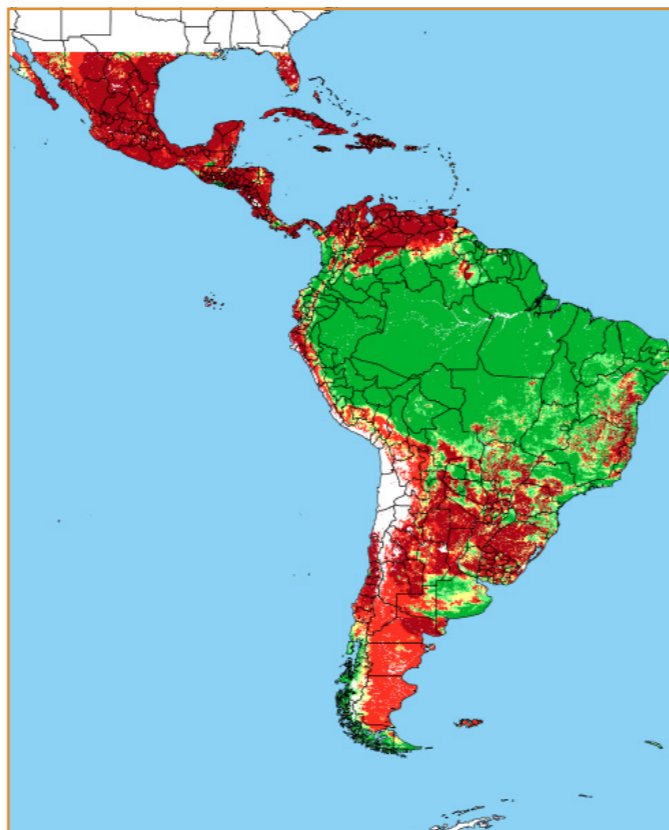
MARÇO / 2020

D	S	T	Q	Q	S	S
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75	76	77	78	79	80	81
82	83	84	85	86	87	88
89	90	91				

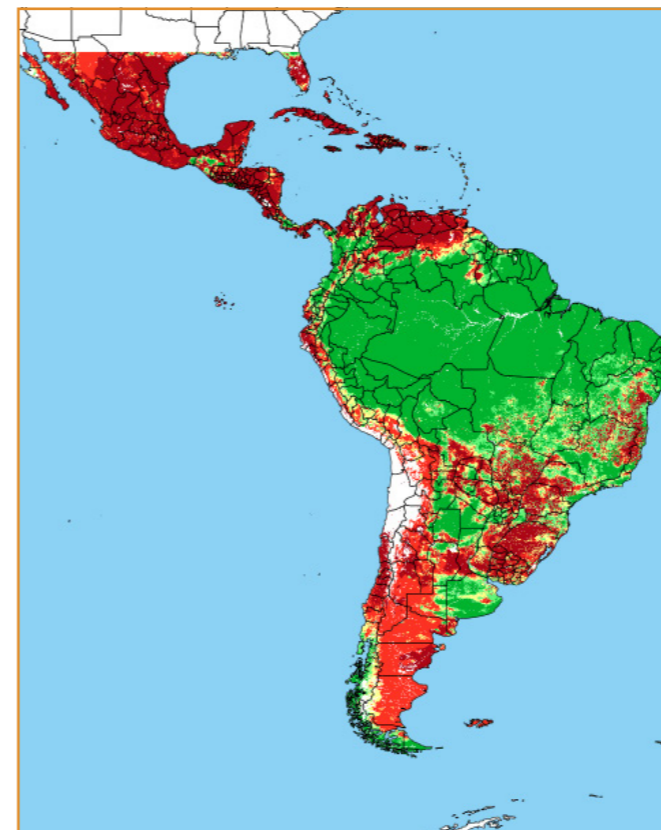
CALENDÁRIO JULIANO



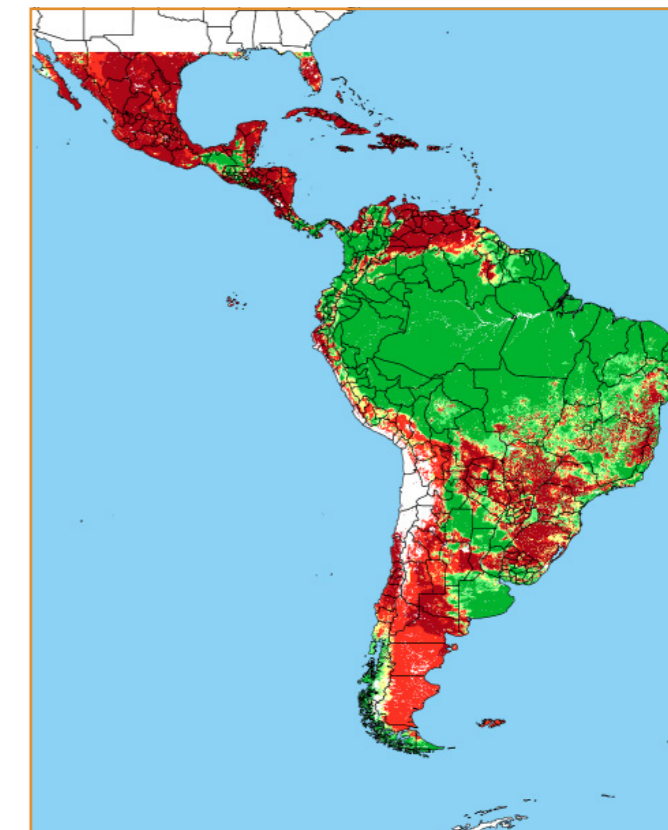
domingo, 29 de março



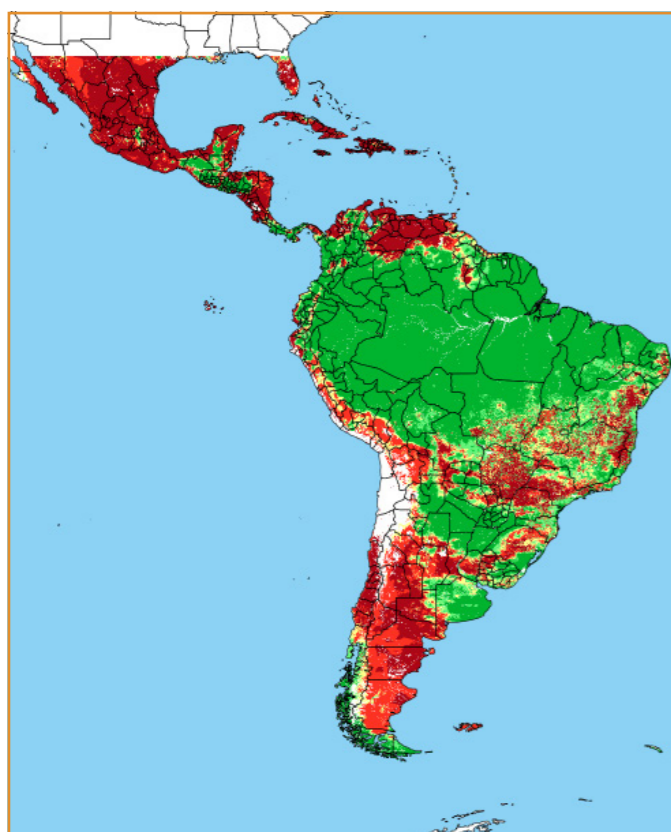
segunda-feira, 30 de março



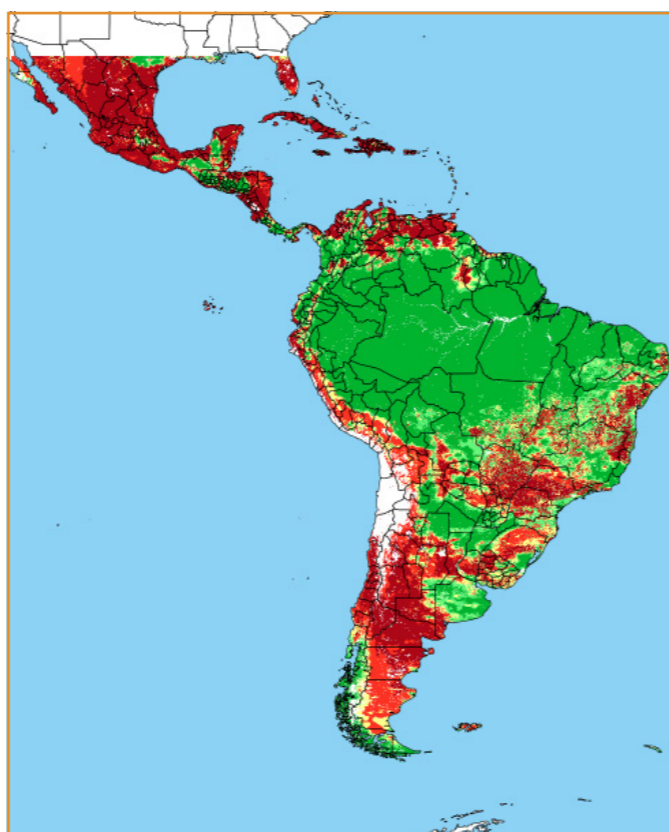
terça-feira, 31 de março



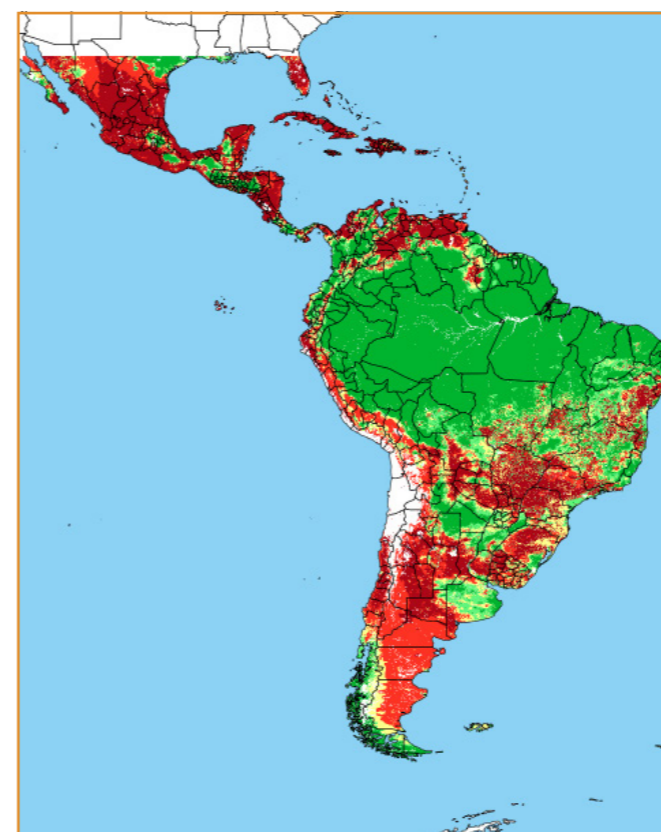
quarta-feira, 1 de abril



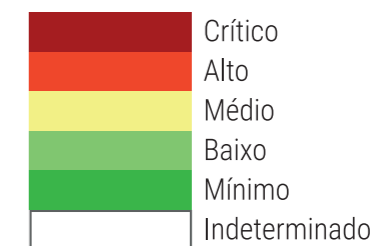
quinta-feira, 2 de abril



sexta-feira, 3 de abril



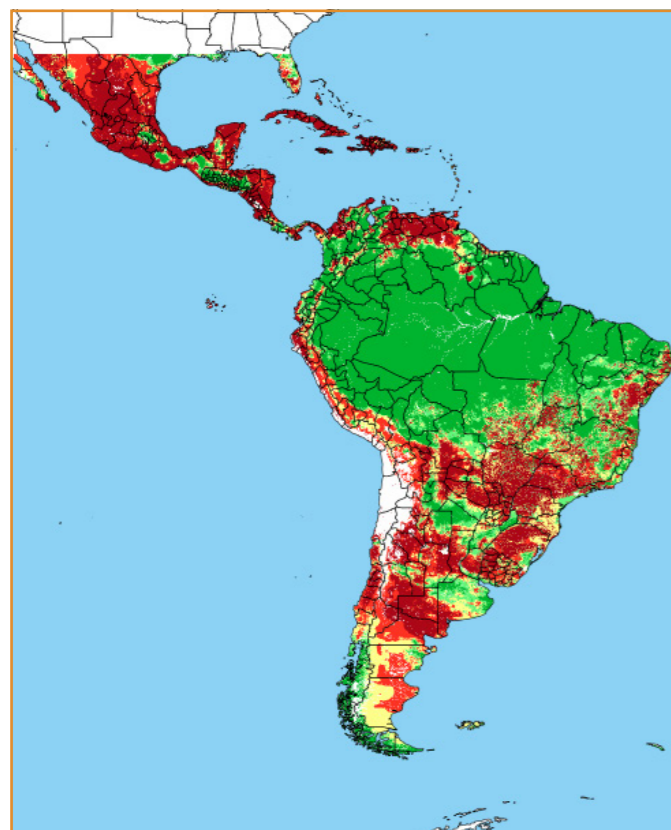
sábado, 4 de abril



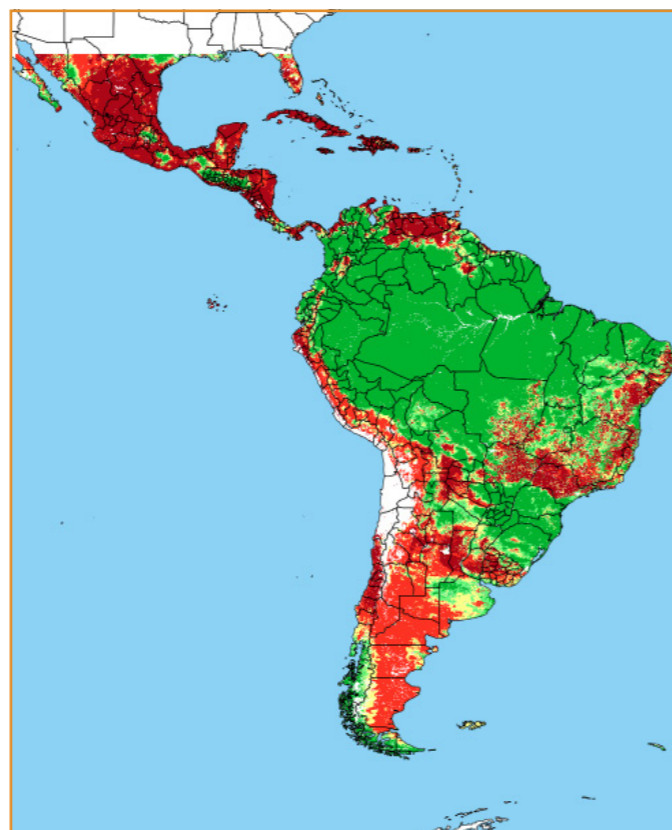
ABRIL / 2020

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110	111	112	113	114	115	116
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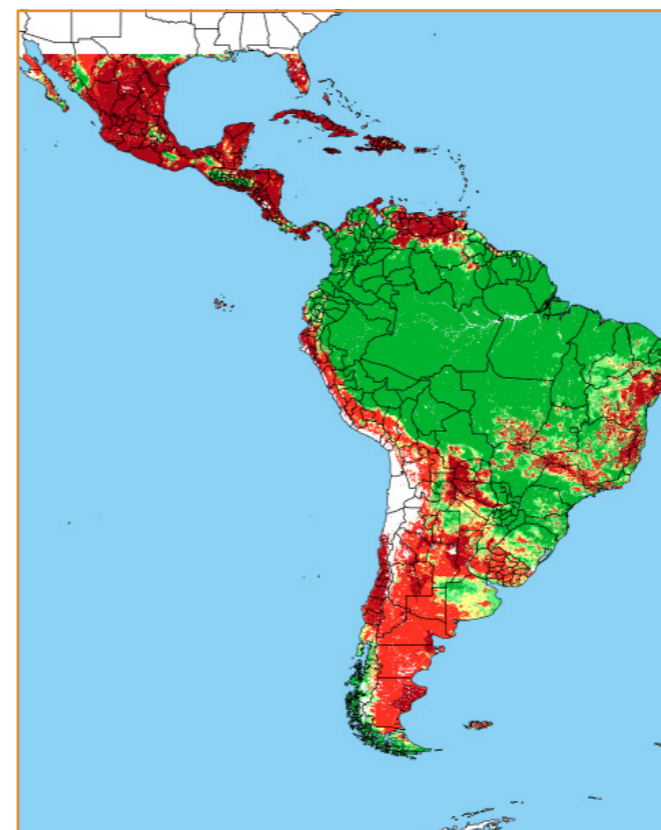
CALENDÁRIO JULIANO



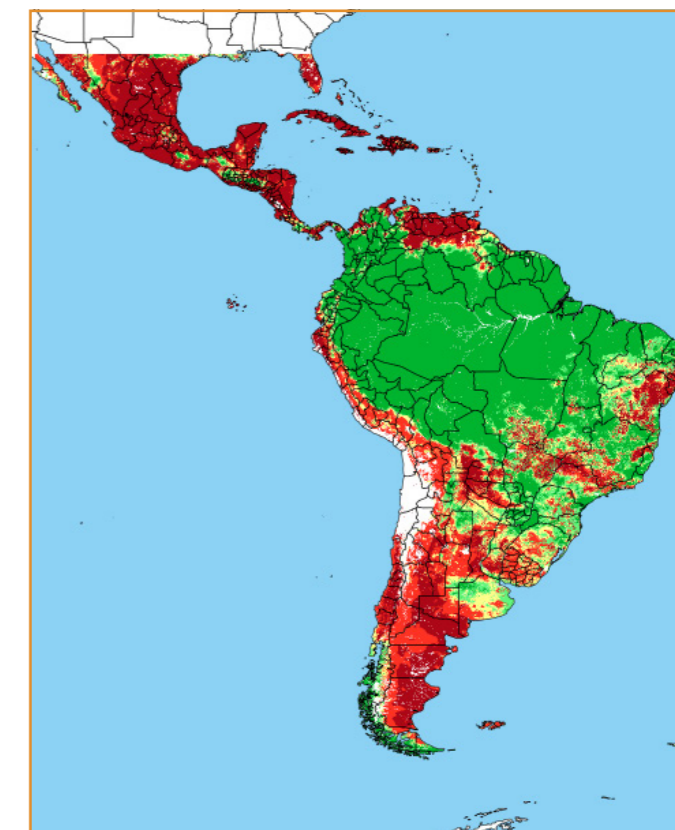
domingo, 5 de abril



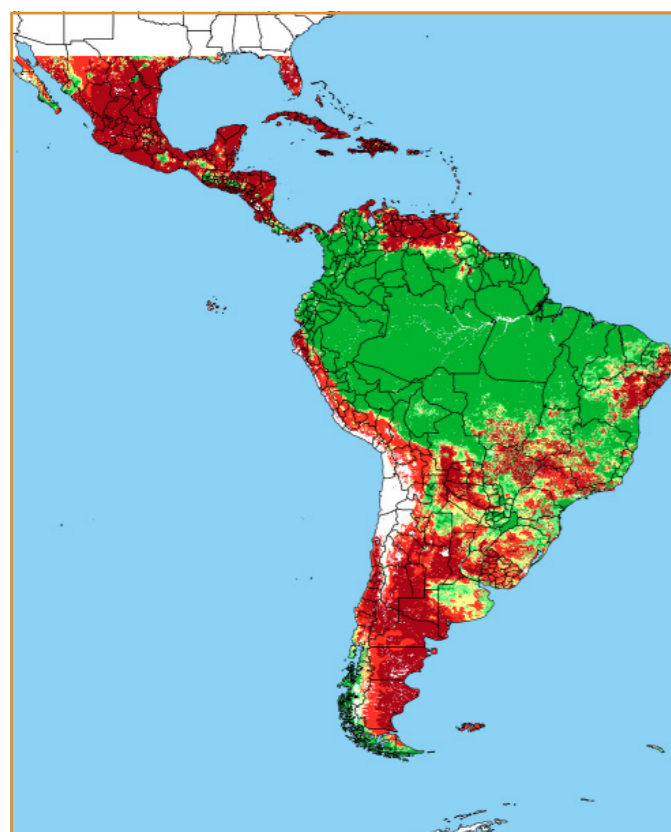
segunda-feira, 6 de abril



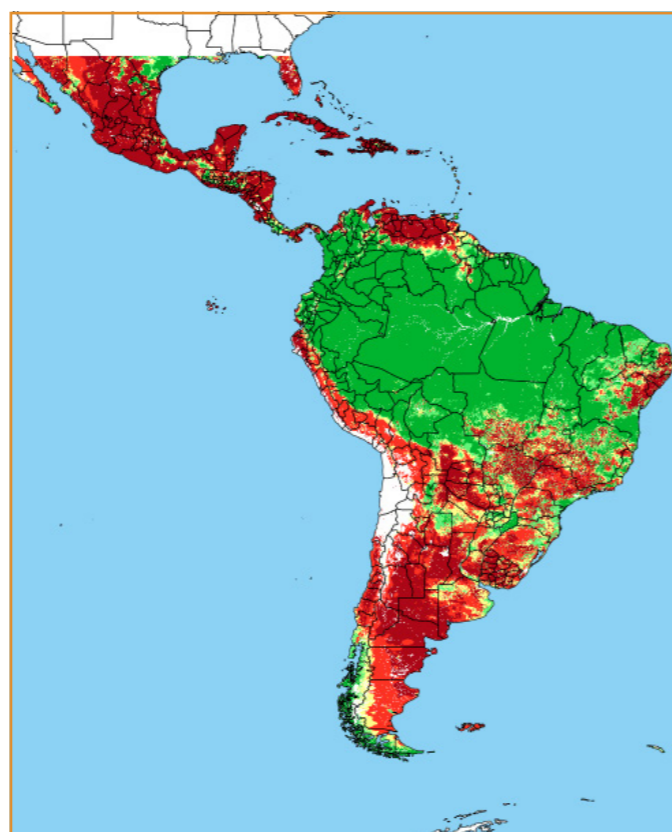
terça-feira, 7 de abril



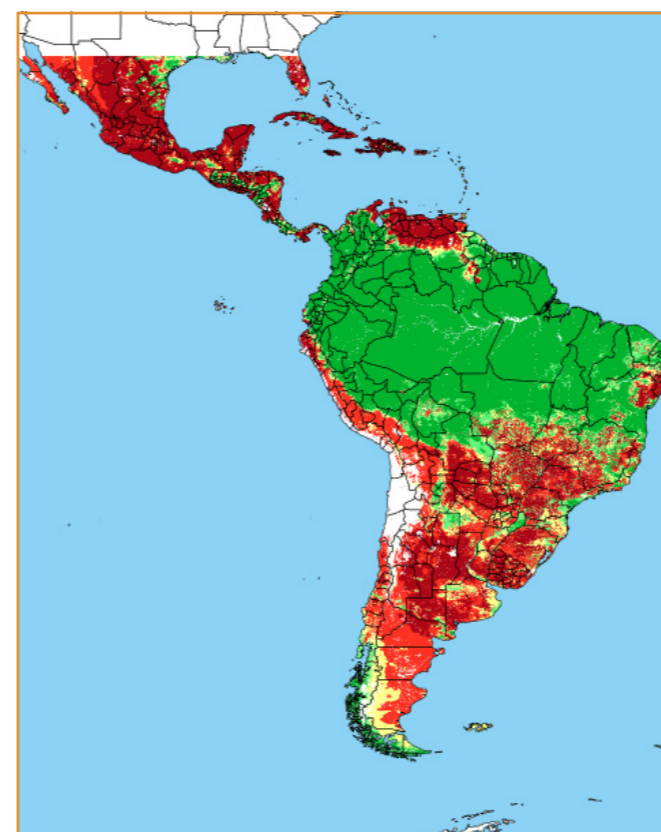
quarta-feira, 8 de abril



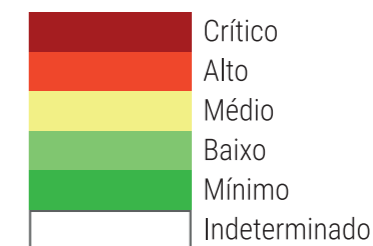
quinta-feira, 9 de abril



sexta-feira, 10 de abril



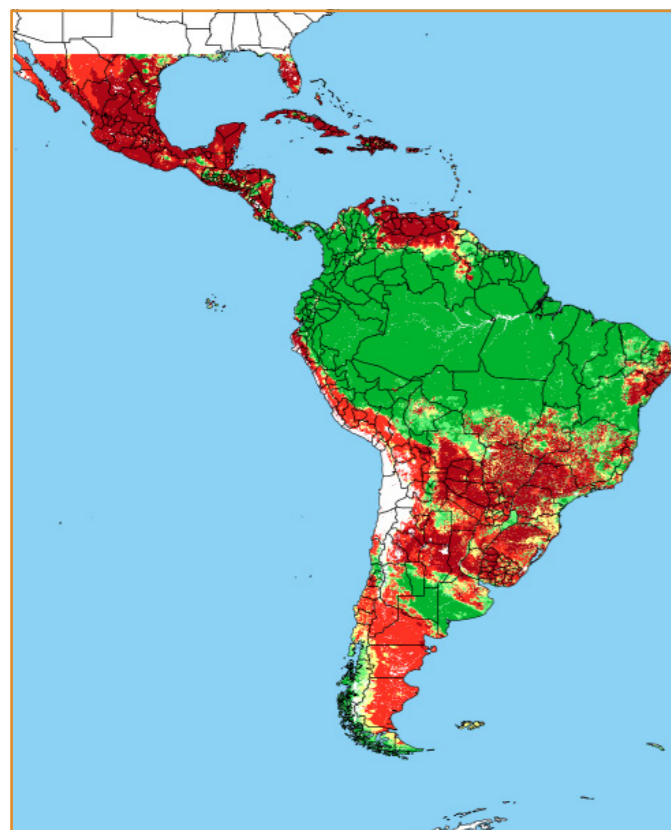
sábado, 11 de abril



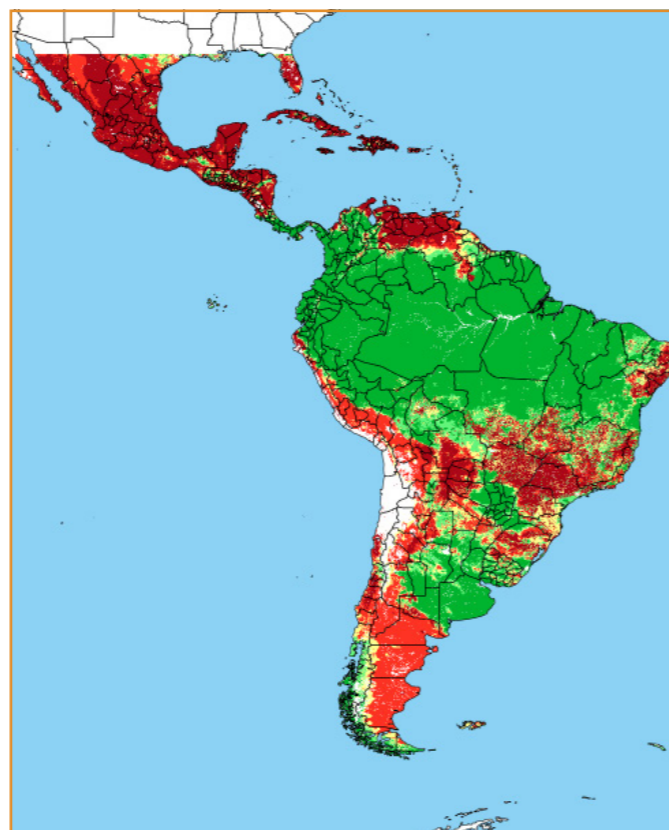
ABRIL / 2020

D	S	T	Q	Q	S	S
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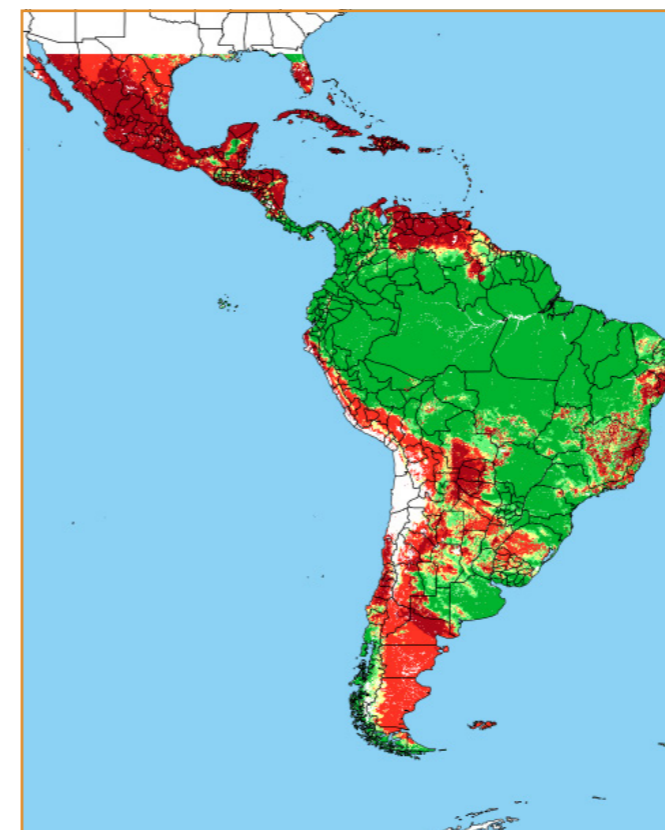
CALENDÁRIO JULIANO



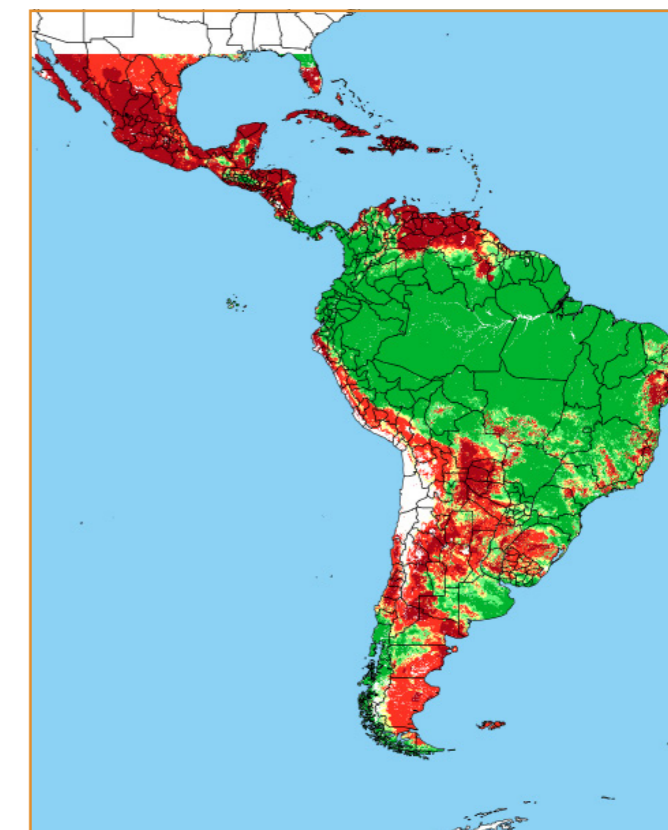
domingo, 12 de abril



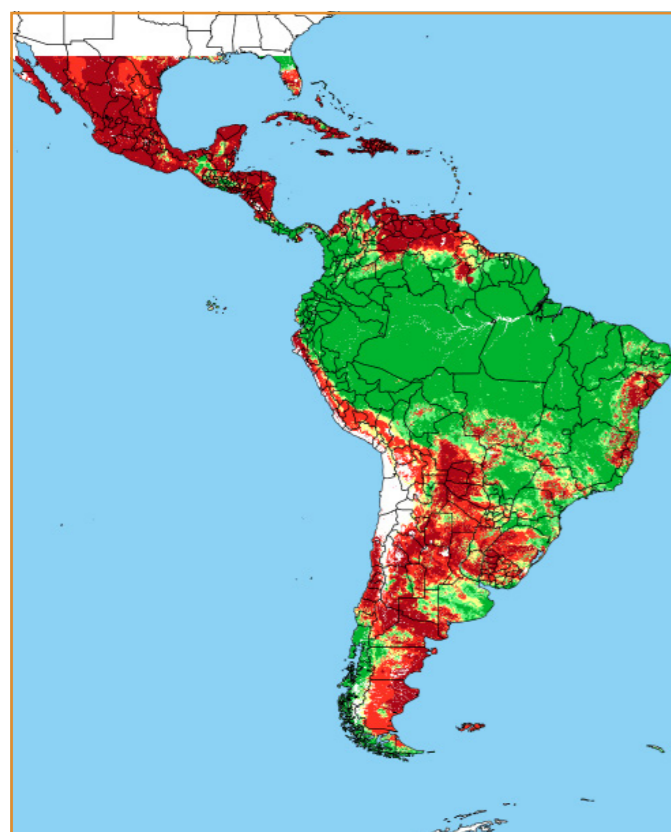
segunda-feira, 13 de abril



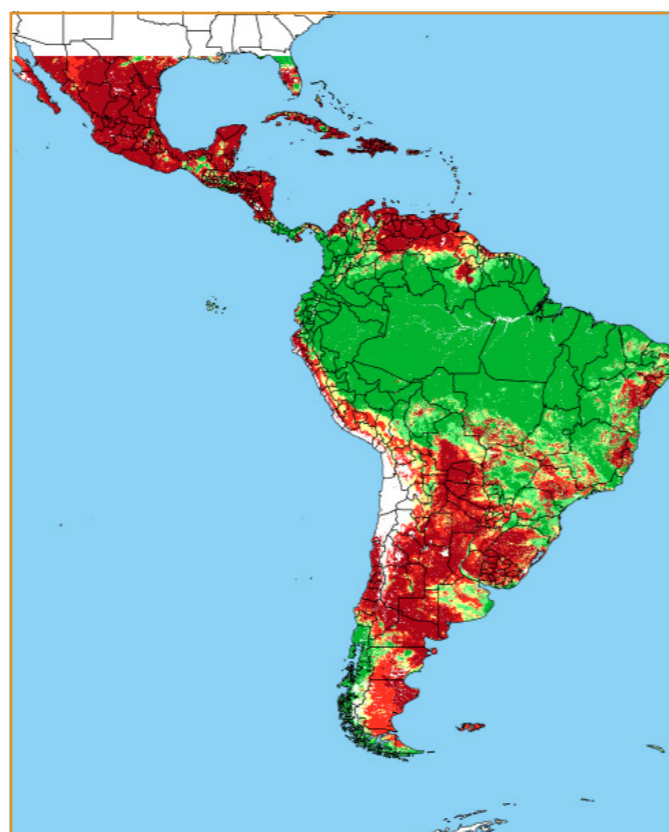
terça-feira, 14 de abril



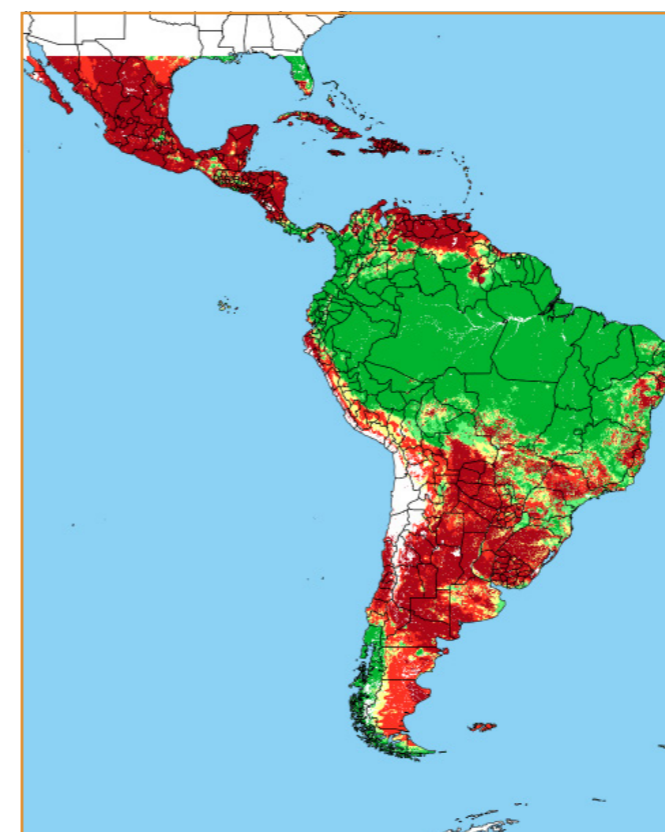
quarta-feira, 15 de abril



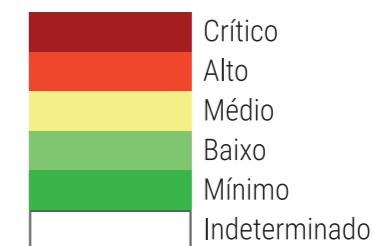
quinta-feira, 16 de abril



sexta-feira, 17 de abril



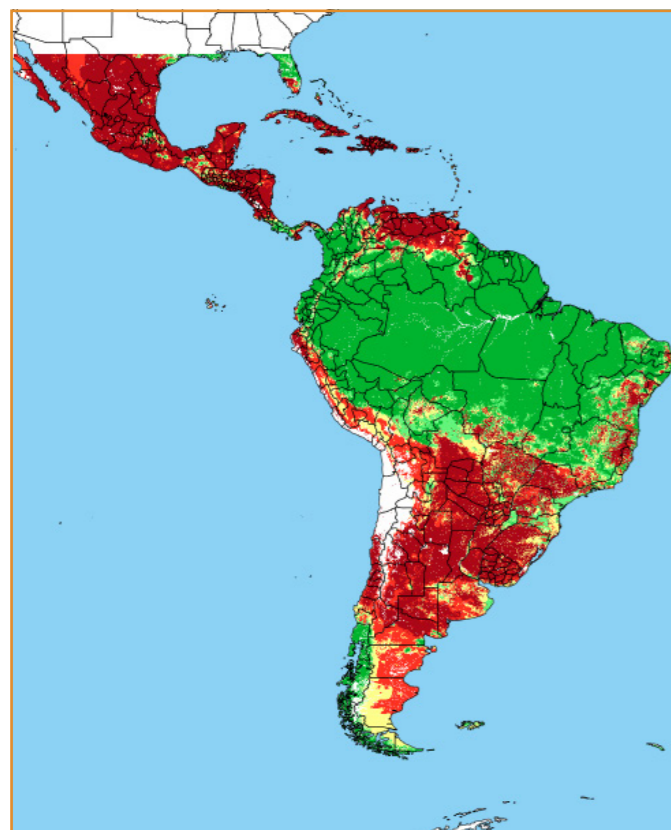
sábado, 18 de abril



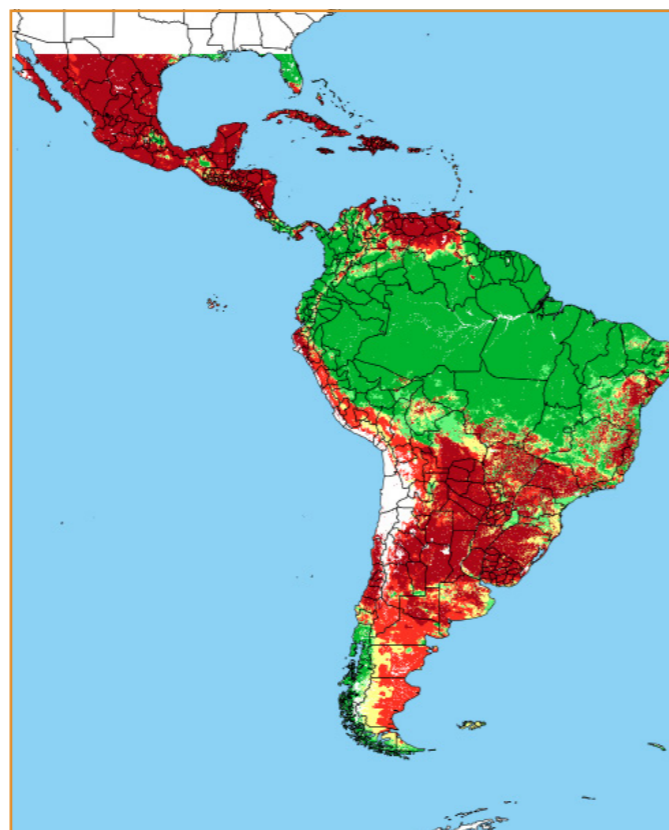
ABRIL / 2020

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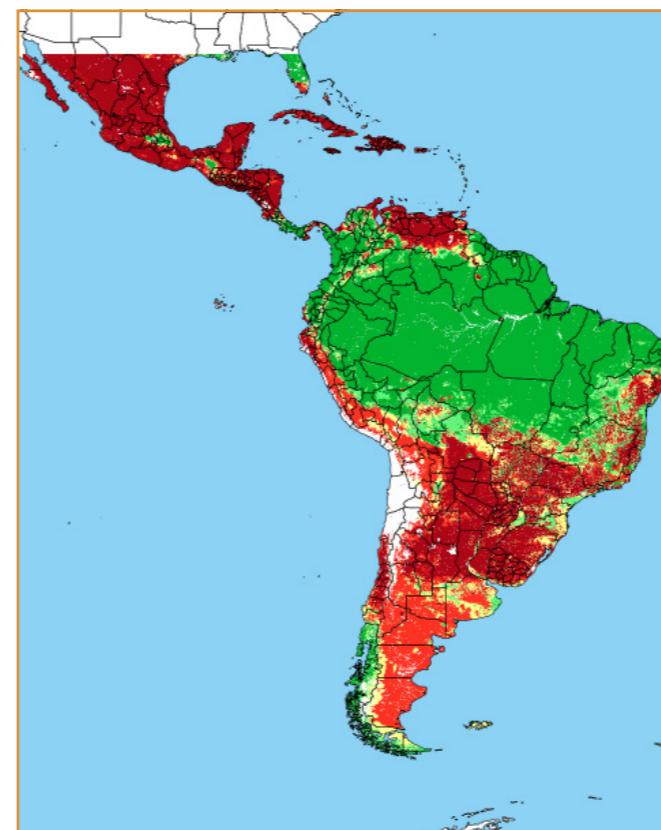
CALENDÁRIO JULIANO



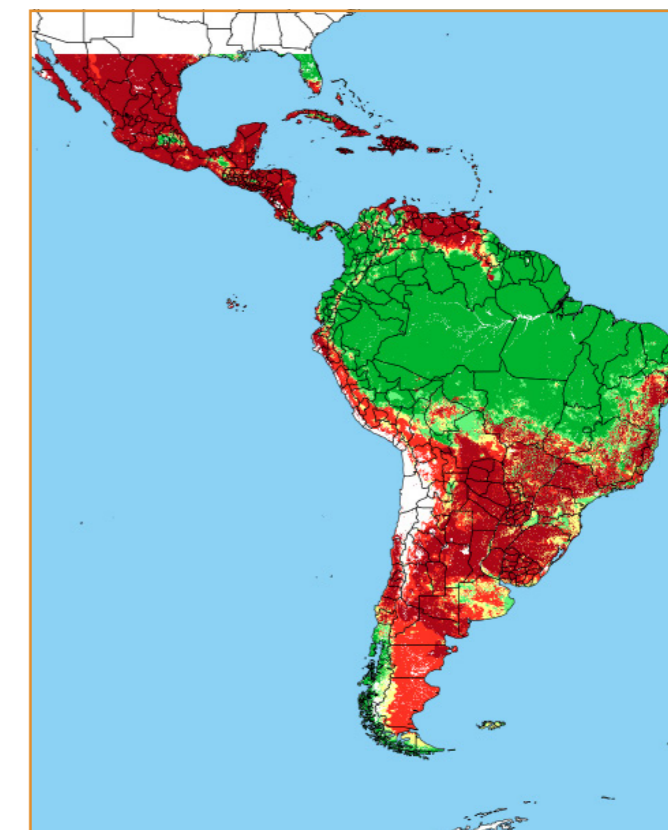
domingo, 19 de abril



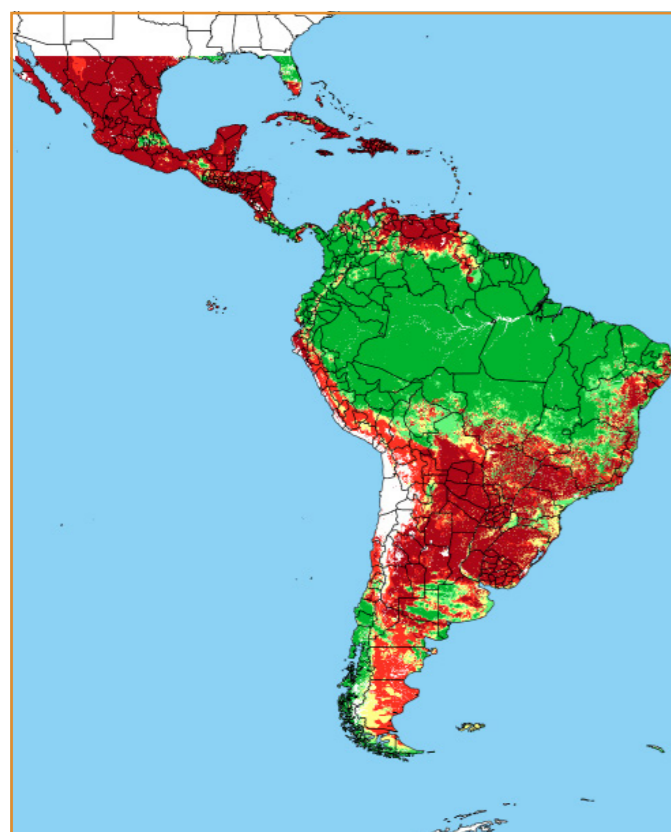
segunda-feira, 20 de abril



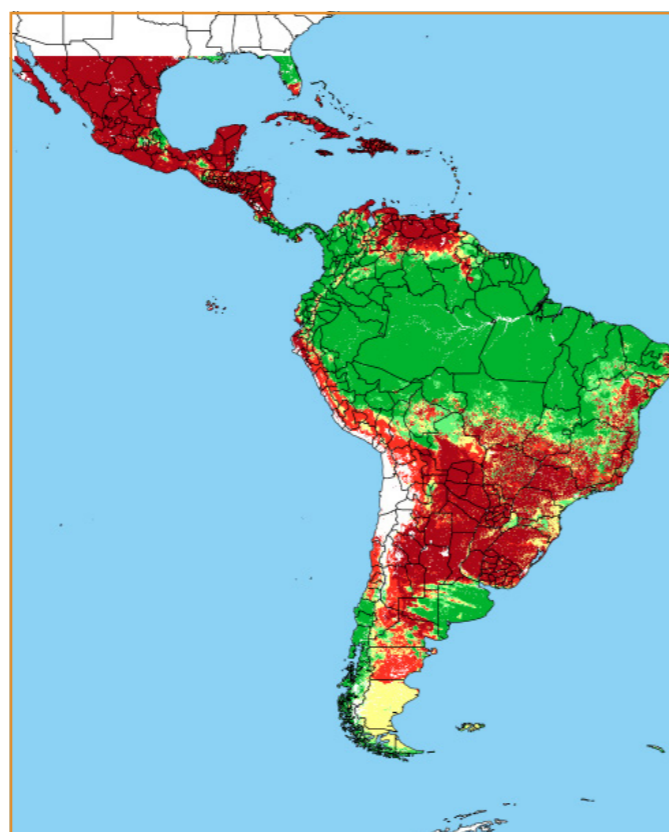
terça-feira, 21 de abril



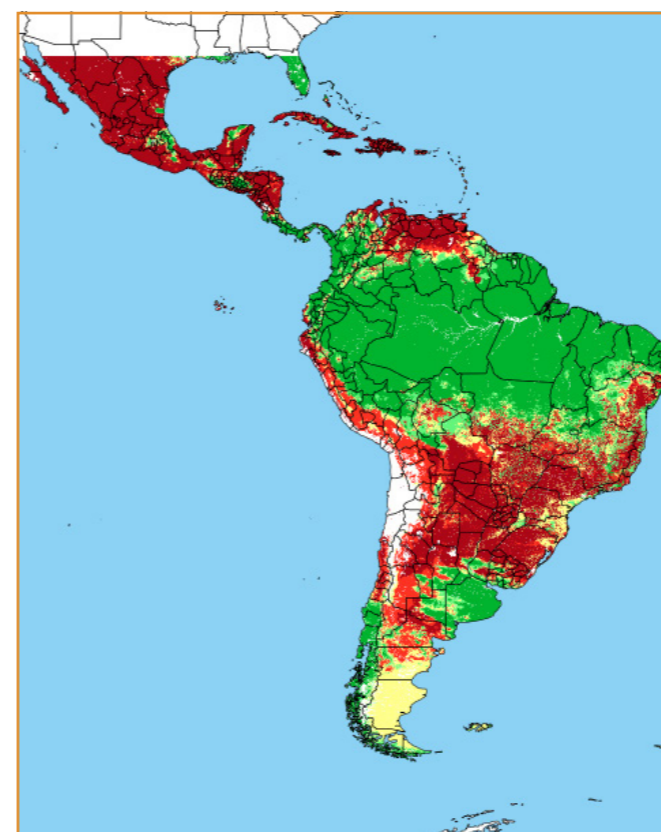
quarta-feira, 22 de abril



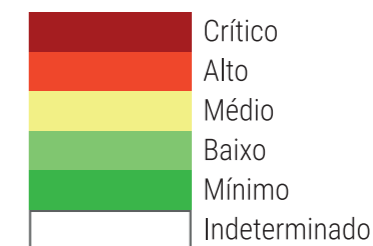
quinta-feira, 23 de abril



sexta-feira, 24 de abril



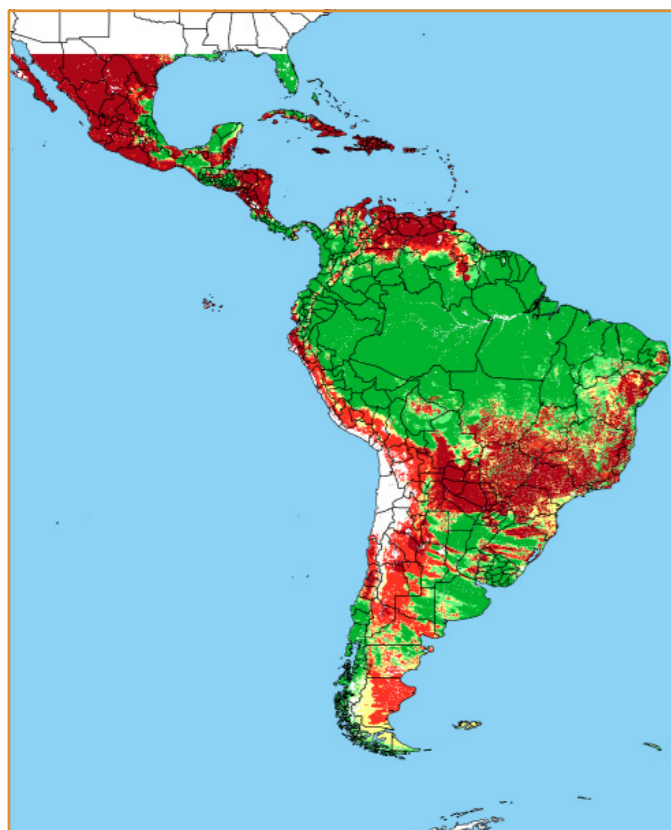
sábado, 25 de abril



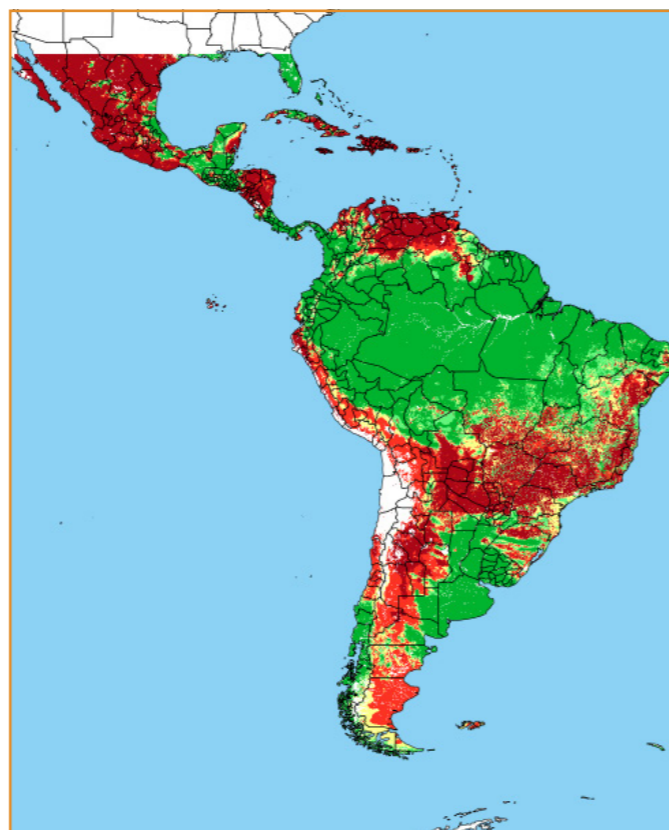
ABRIL / 2020

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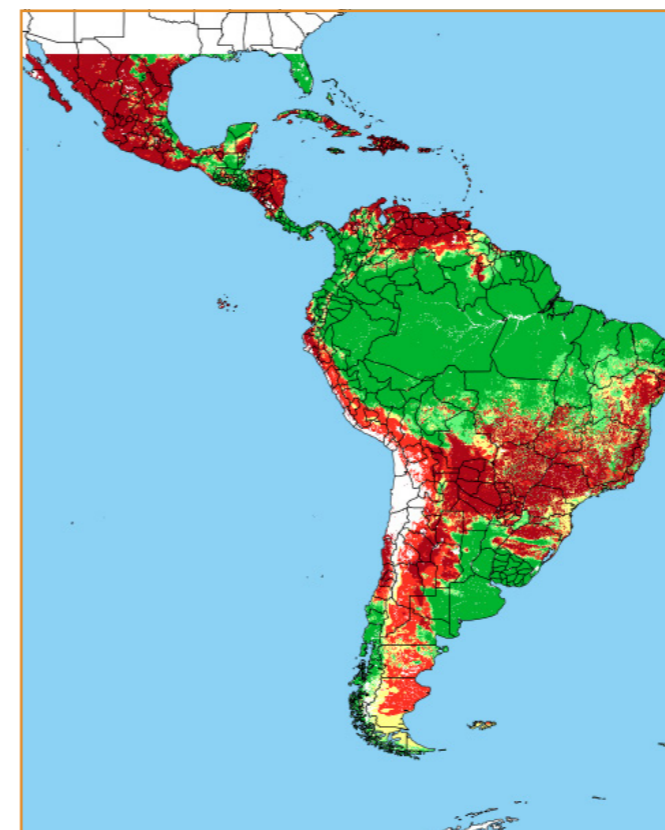
CALENDÁRIO JULIANO



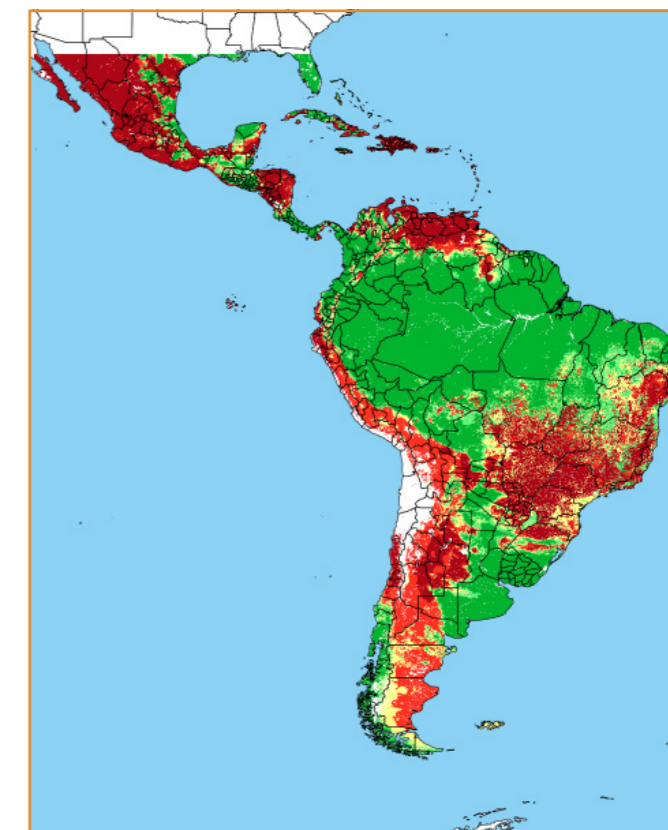
domingo, 26 de abril



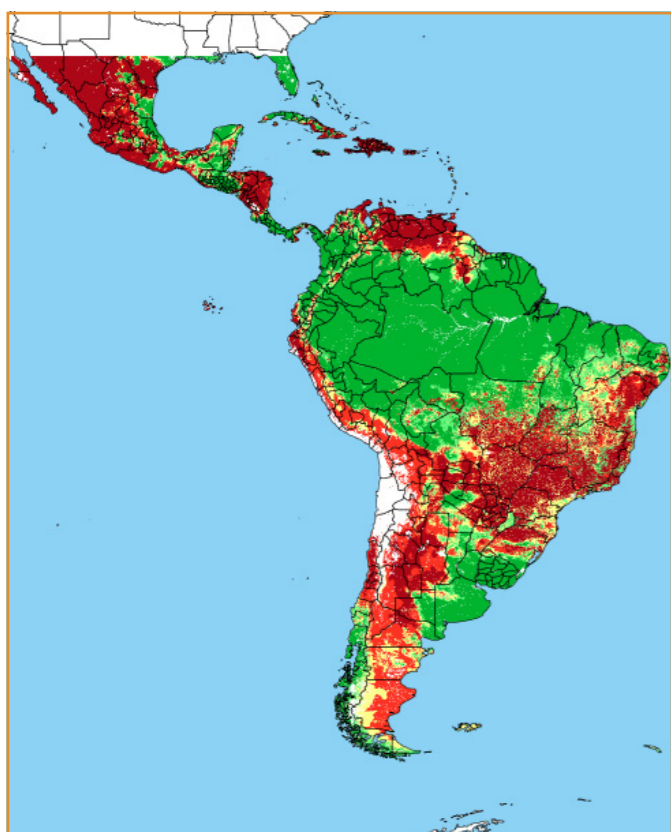
segunda-feira, 27 de abril



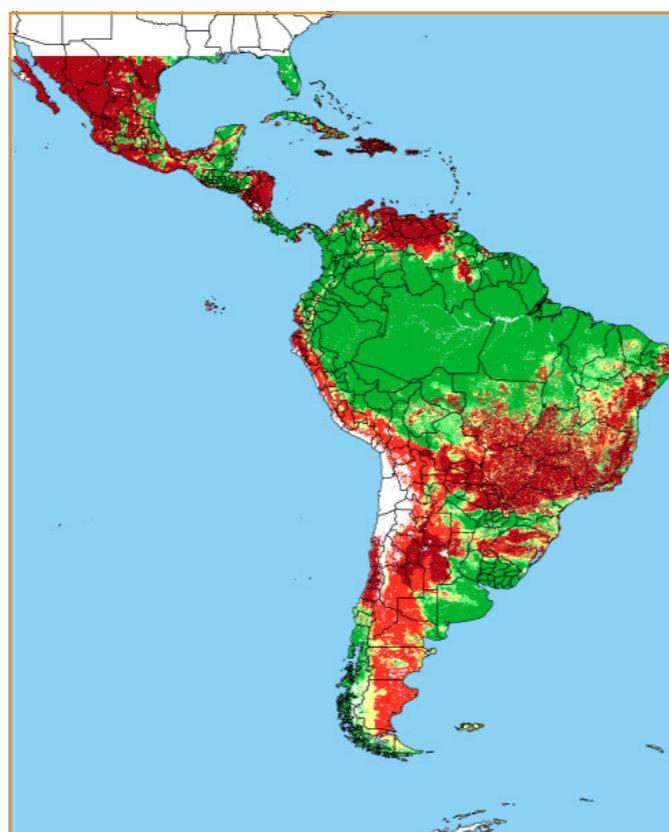
terça-feira, 28 de abril



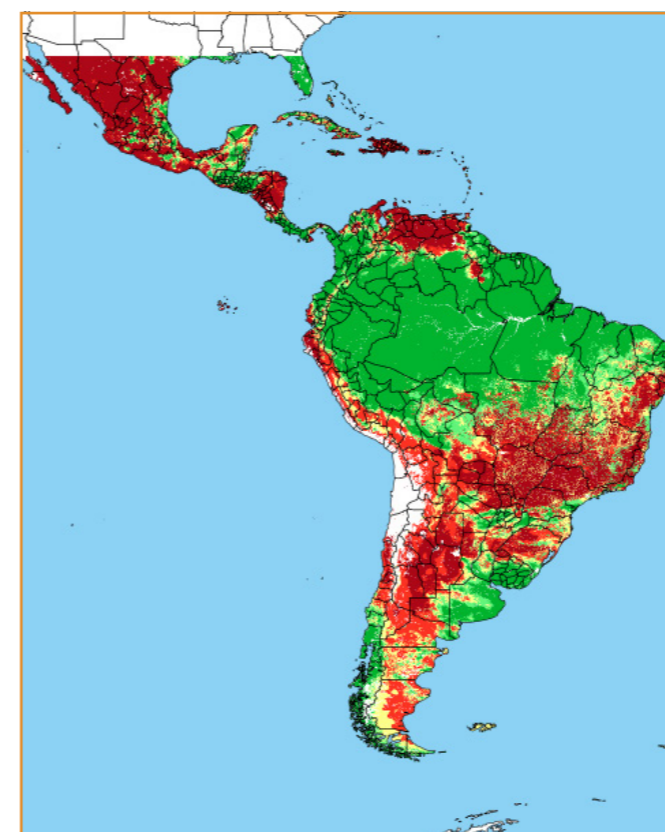
quarta-feira, 29 de abril



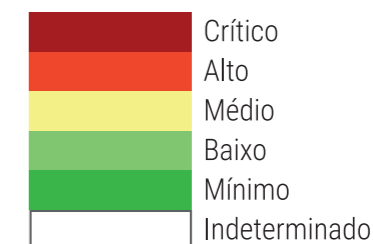
quinta-feira, 30 de abril



sexta-feira, 1 de maio



sábado, 2 de maio

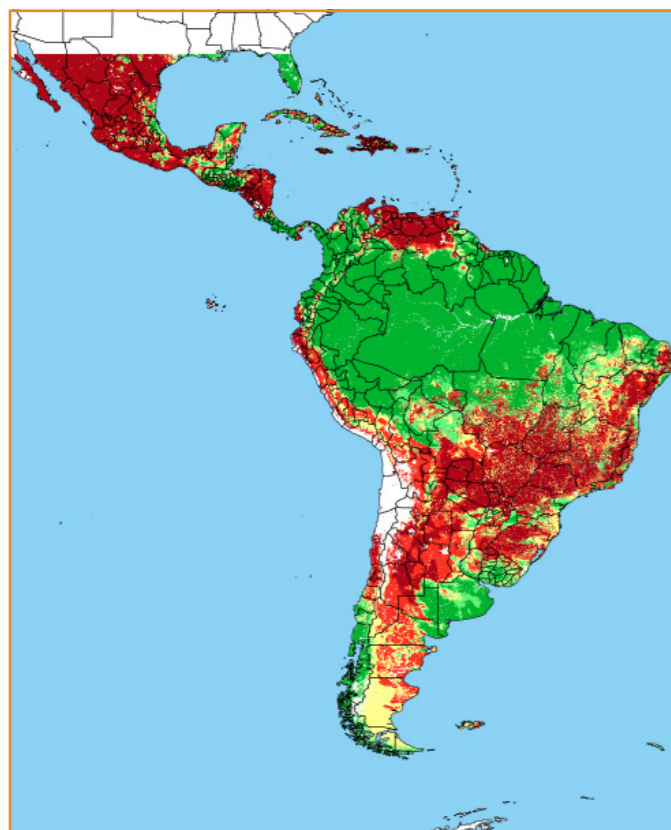


ABRIL / 2020

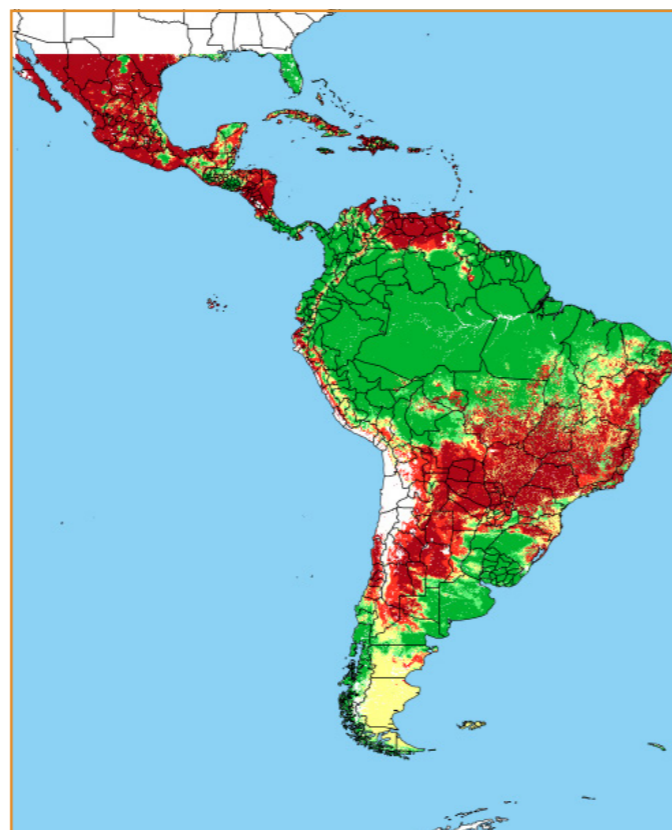
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117	118	119	120	121	122	123

CALENDÁRIO JULIANO

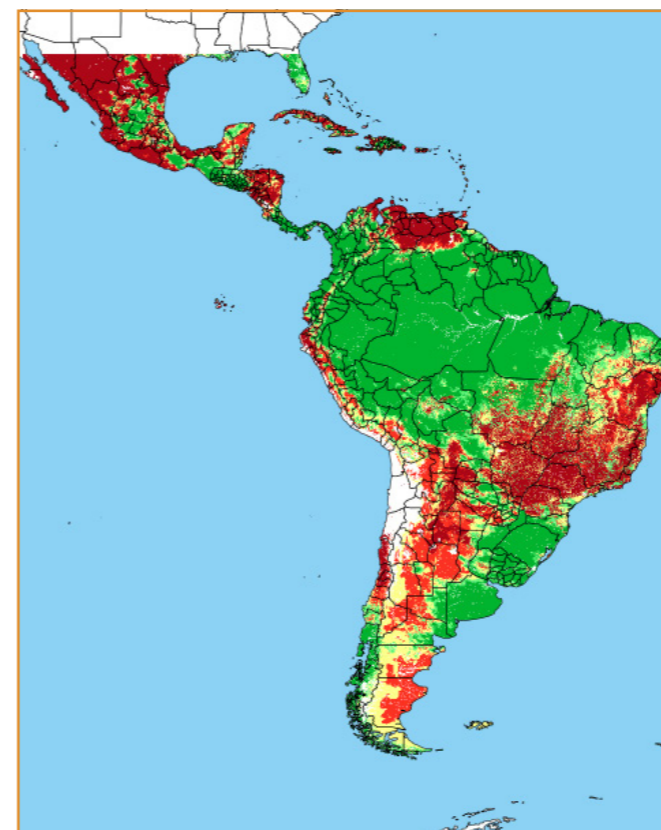




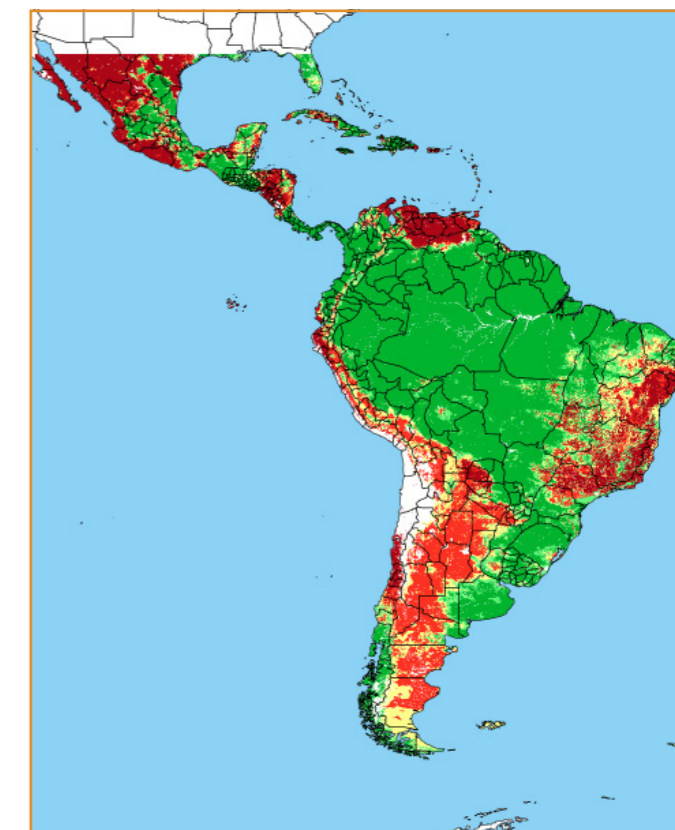
domingo, 3 de maio



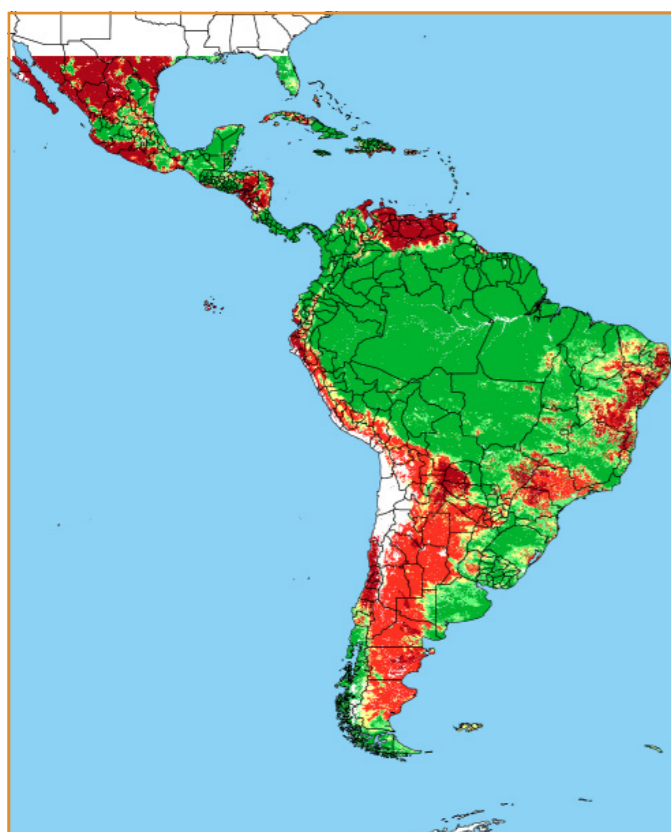
segunda-feira, 4 de maio



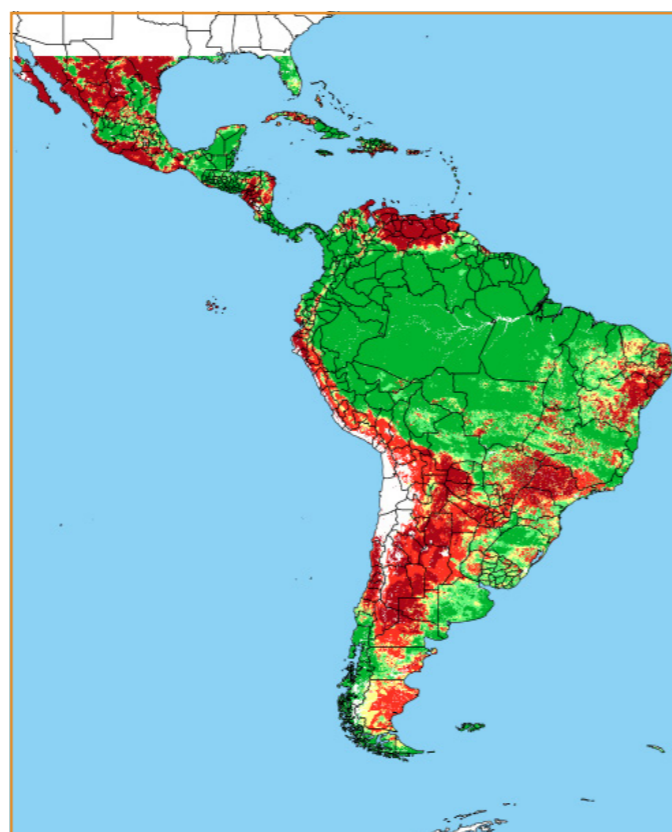
terça-feira, 5 de maio



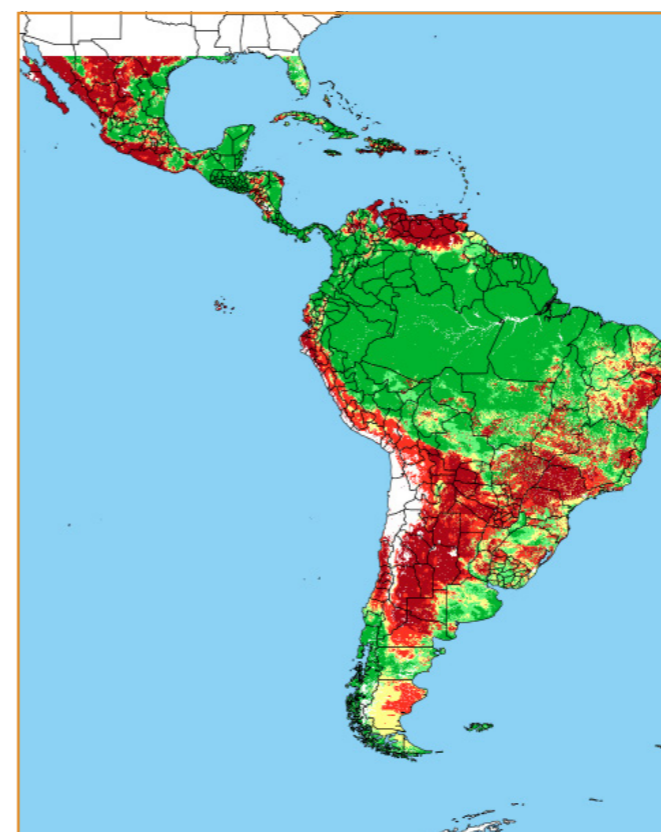
quarta-feira, 6 de maio



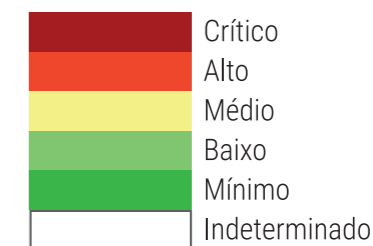
quinta-feira, 7 de maio



sexta-feira, 8 de maio

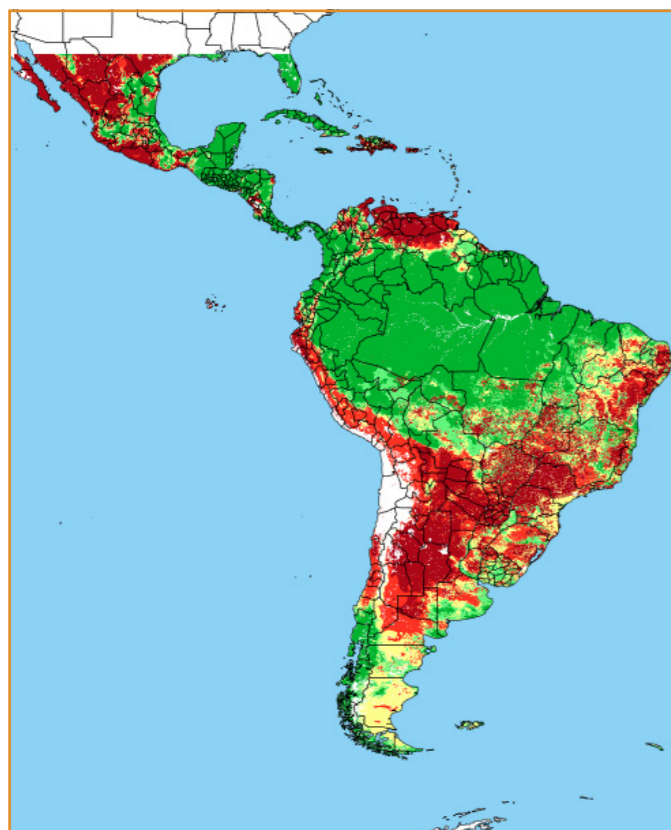


sábado, 9 de maio

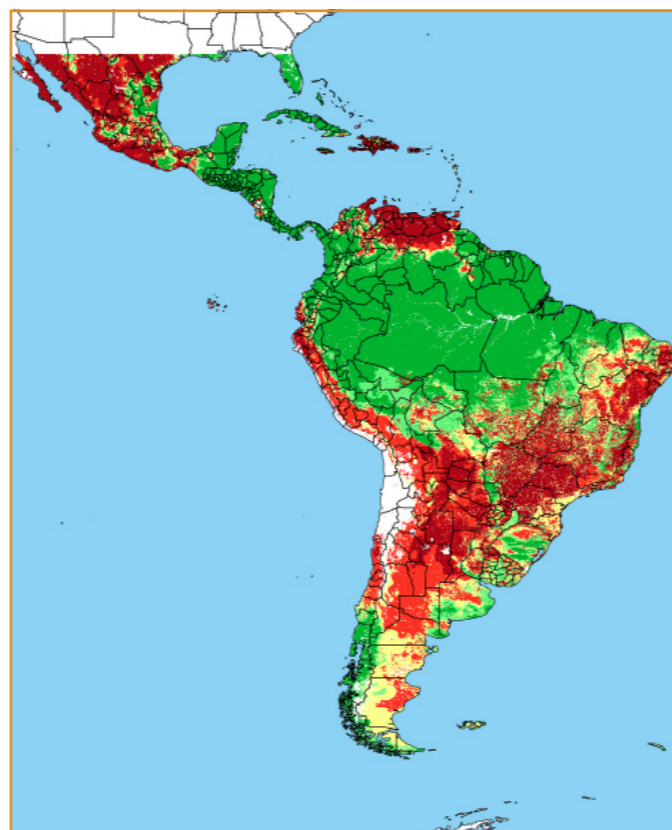


MAIO / 2020						
D	S	T	Q	Q	S	S
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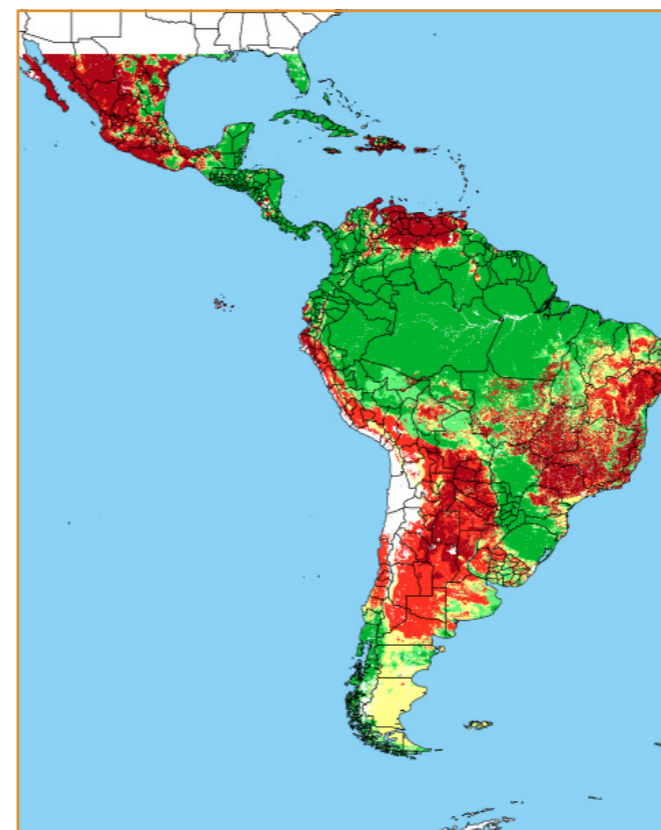
CALENDÁRIO JULIANO



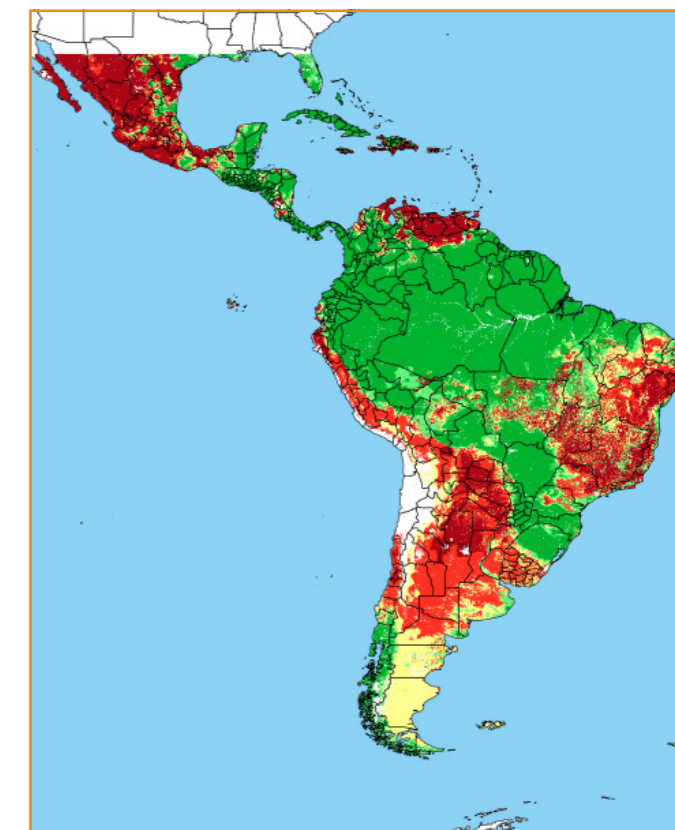
domingo, 10 de maio



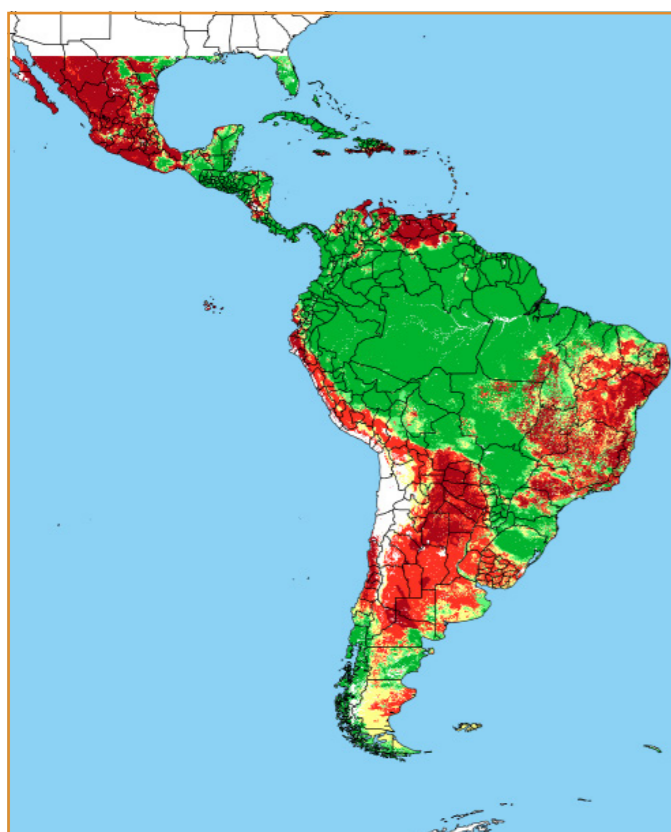
segunda-feira, 11 de maio



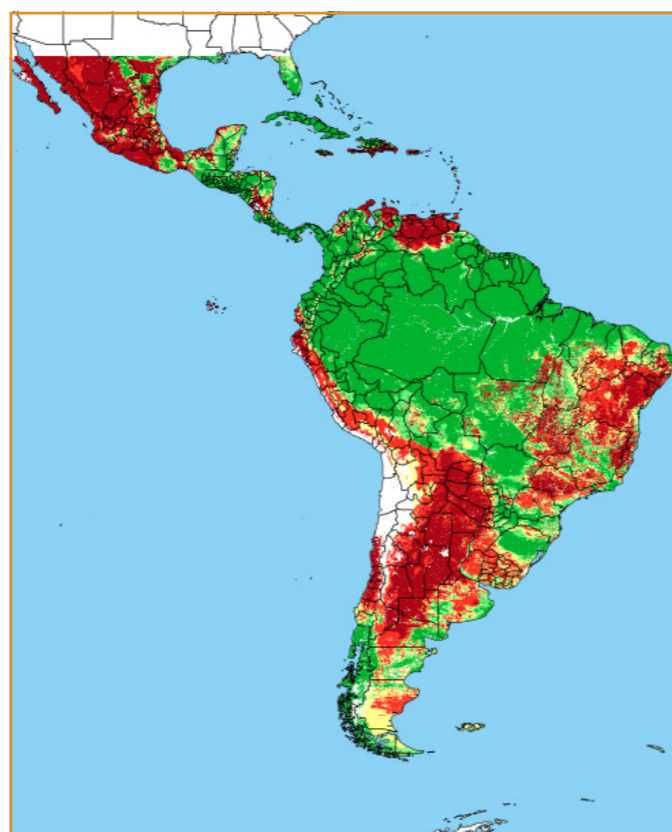
terça-feira, 12 de maio



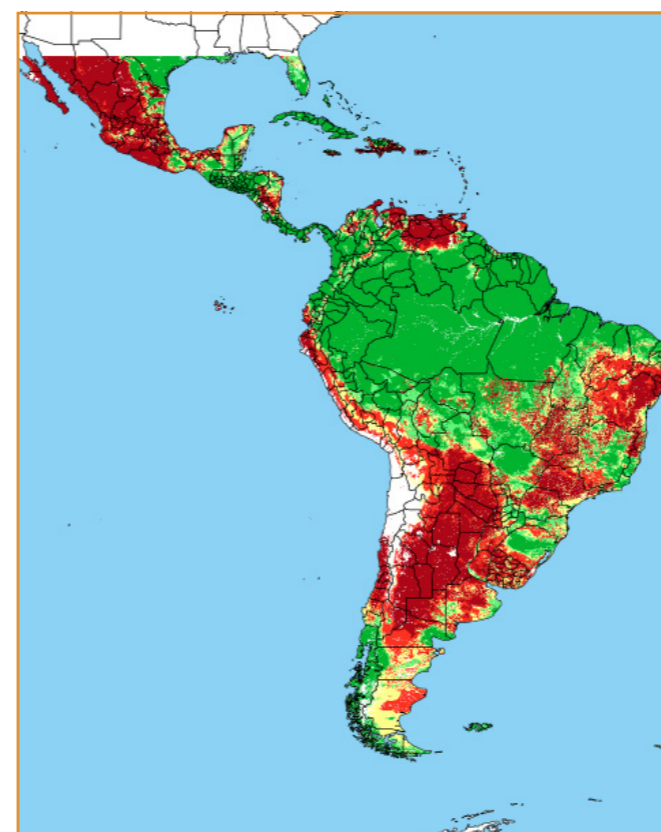
quarta-feira, 13 de maio



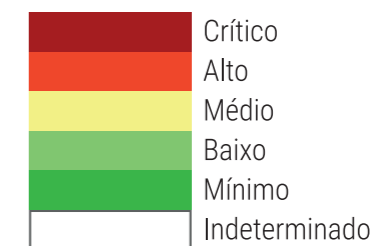
quinta-feira, 14 de maio



sexta-feira, 15 de maio

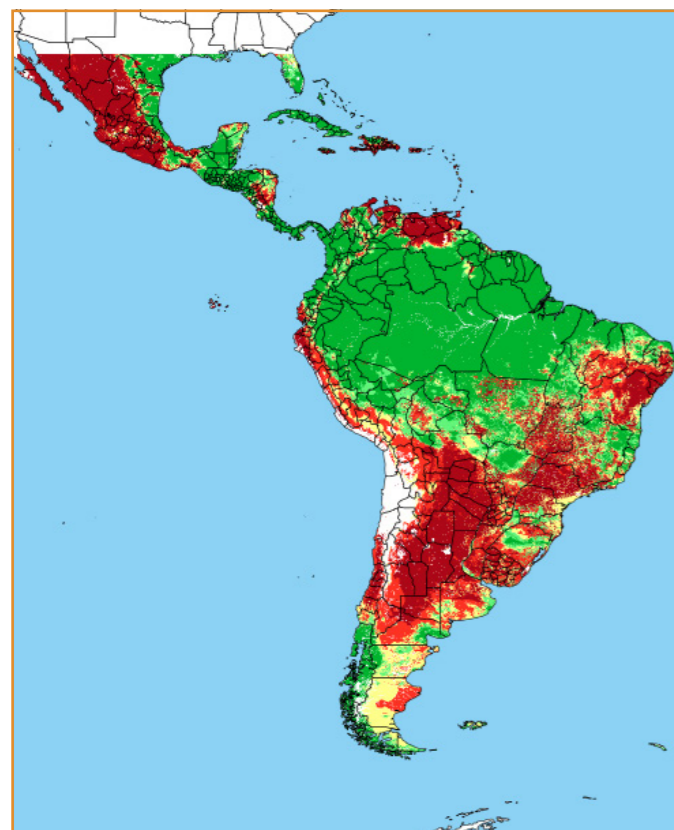


sábado, 16 de maio

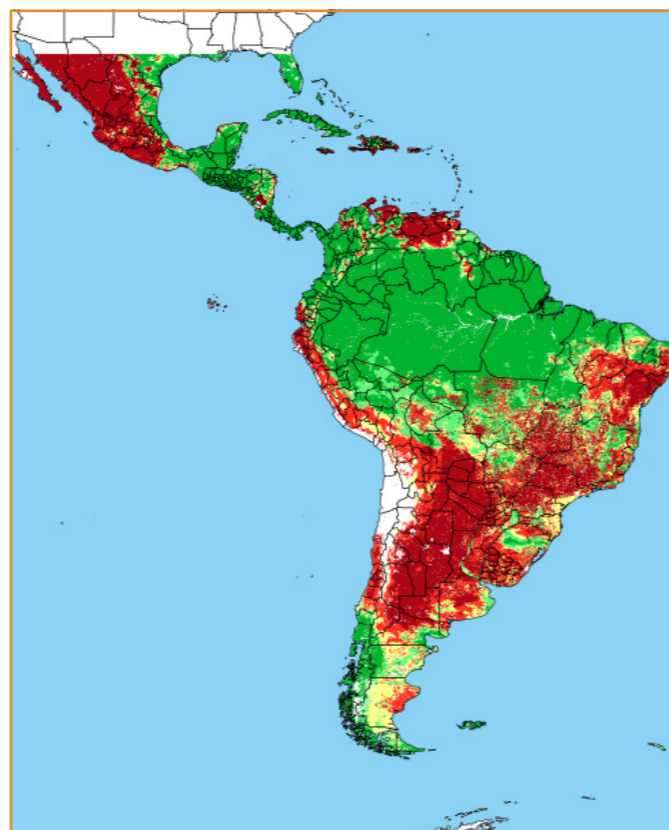


MAIO / 2020						
D	S	T	Q	Q	S	S
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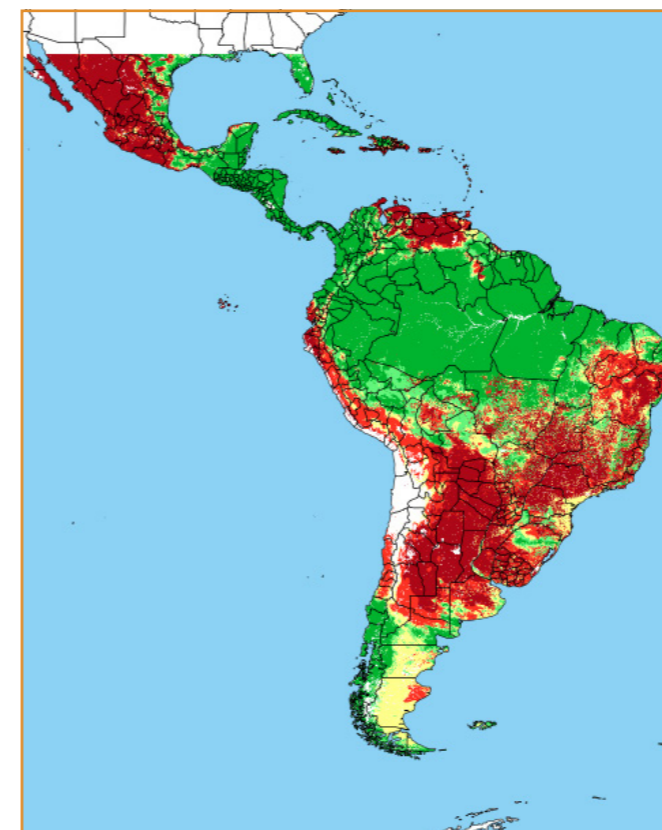
CALENDÁRIO JULIANO



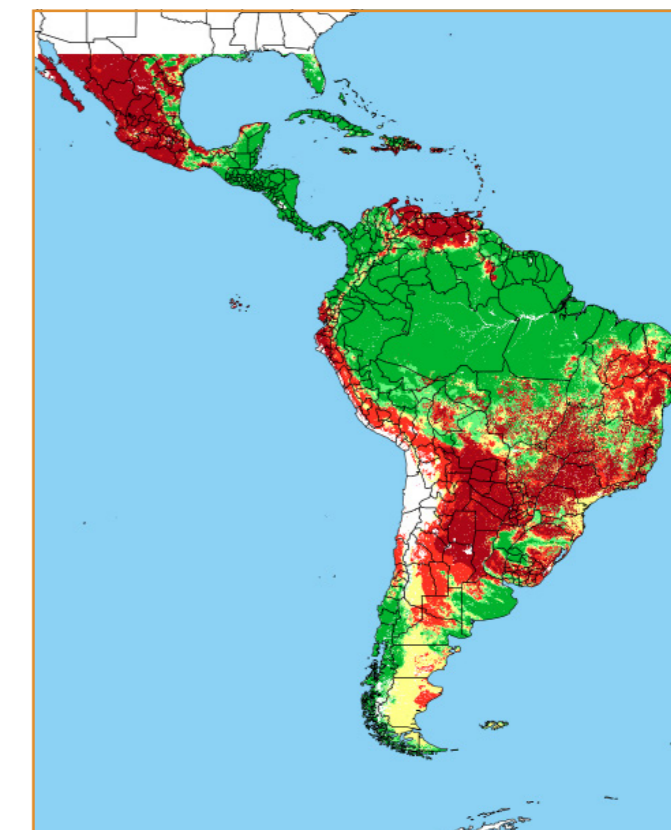
domingo, 17 de maio



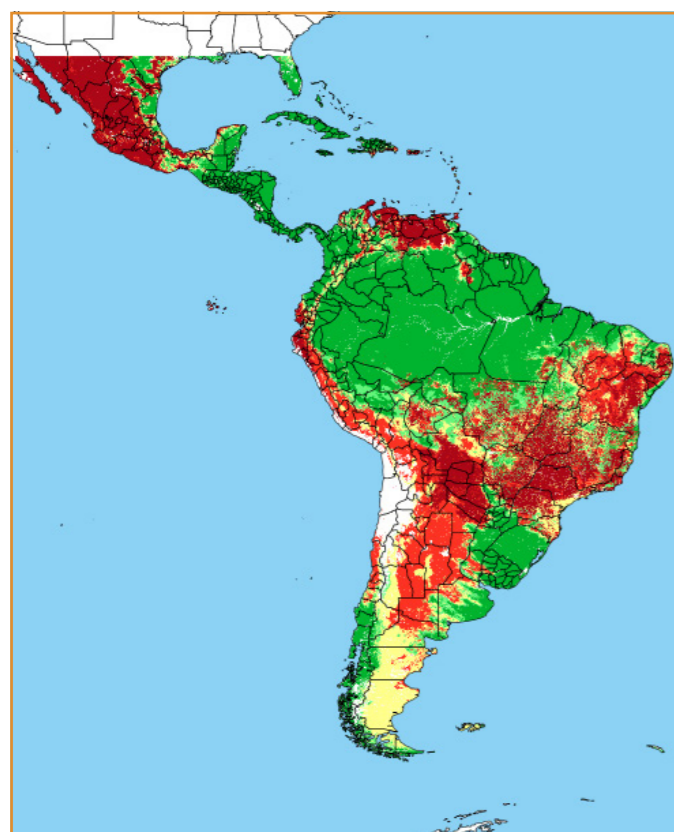
segunda-feira, 18 de maio



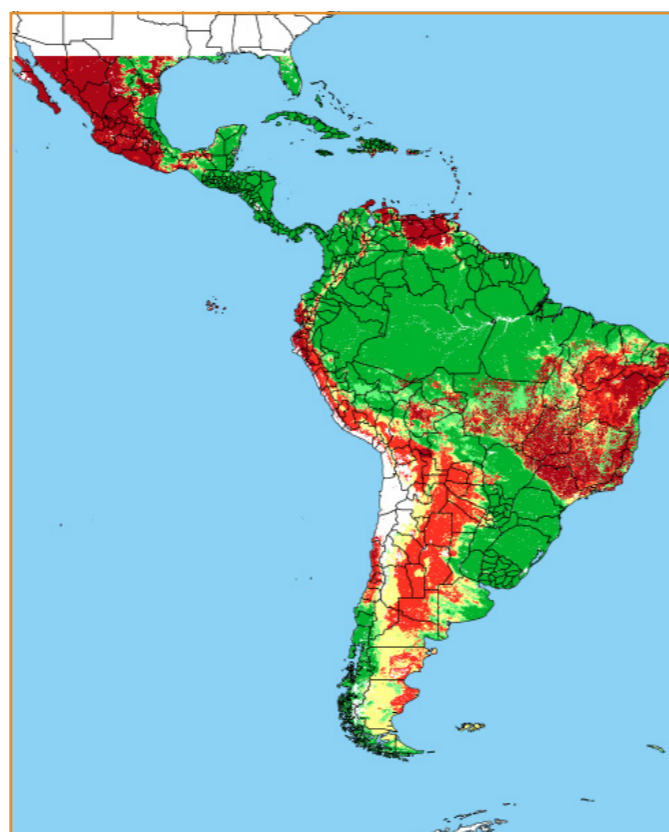
terça-feira, 19 de maio



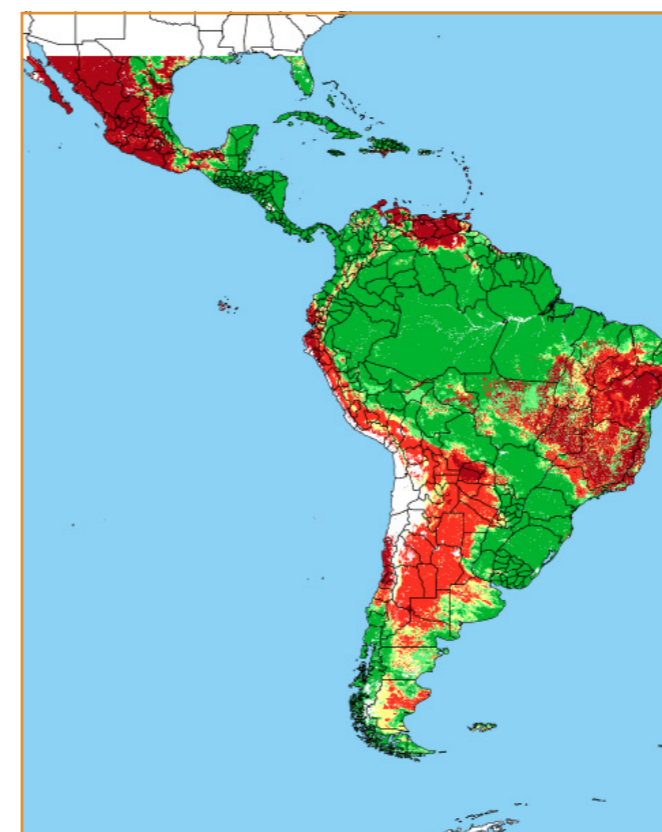
quarta-feira, 20 de maio



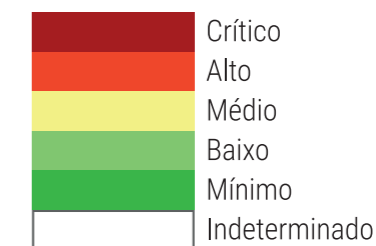
quinta-feira, 21 de maio



sexta-feira, 22 de maio

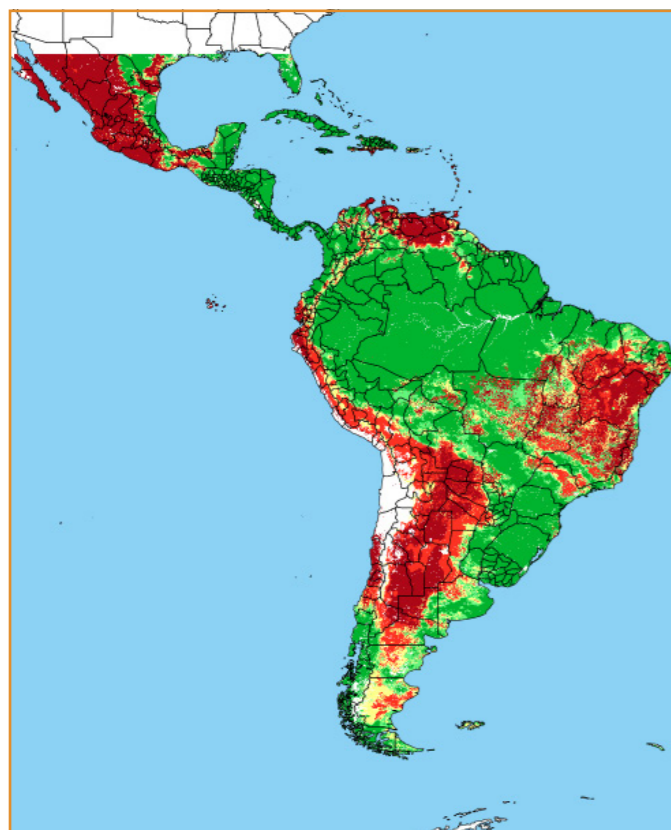


sábado, 23 de maio

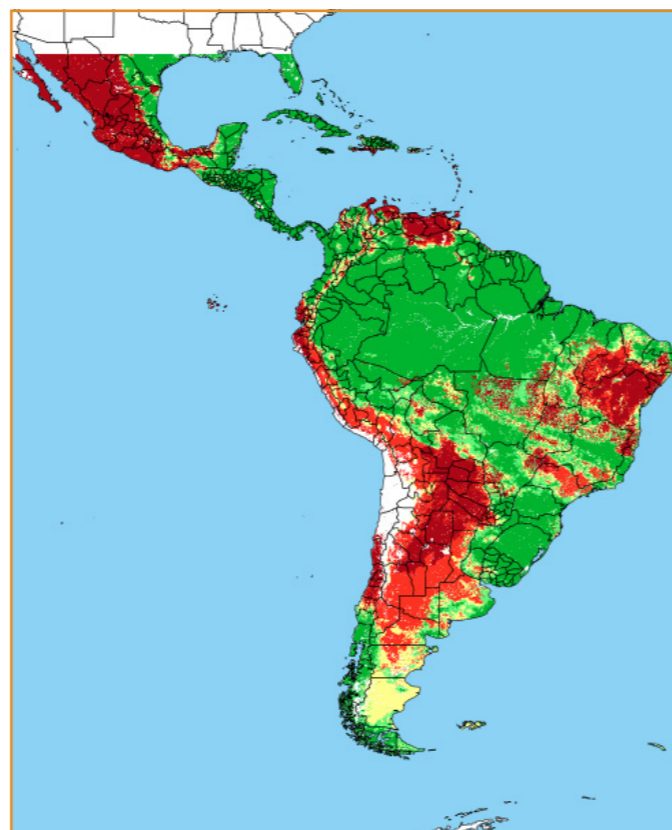


MAIO / 2020						
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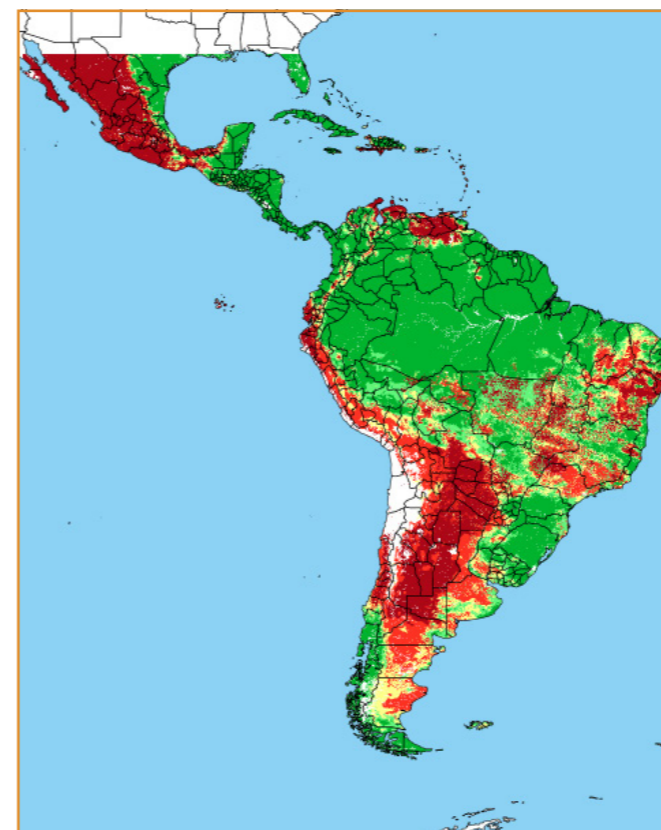
CALENDÁRIO JULIANO



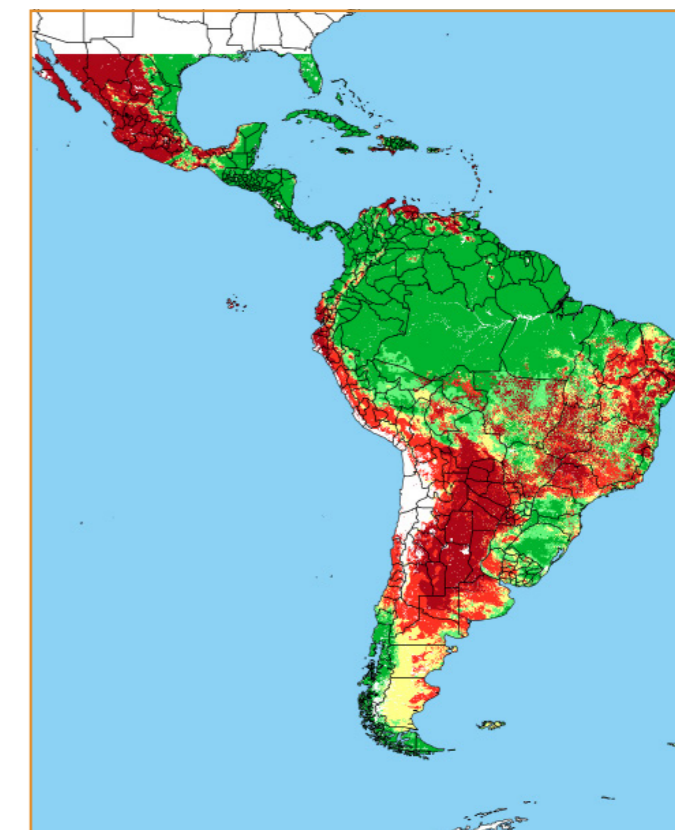
domingo, 24 de maio



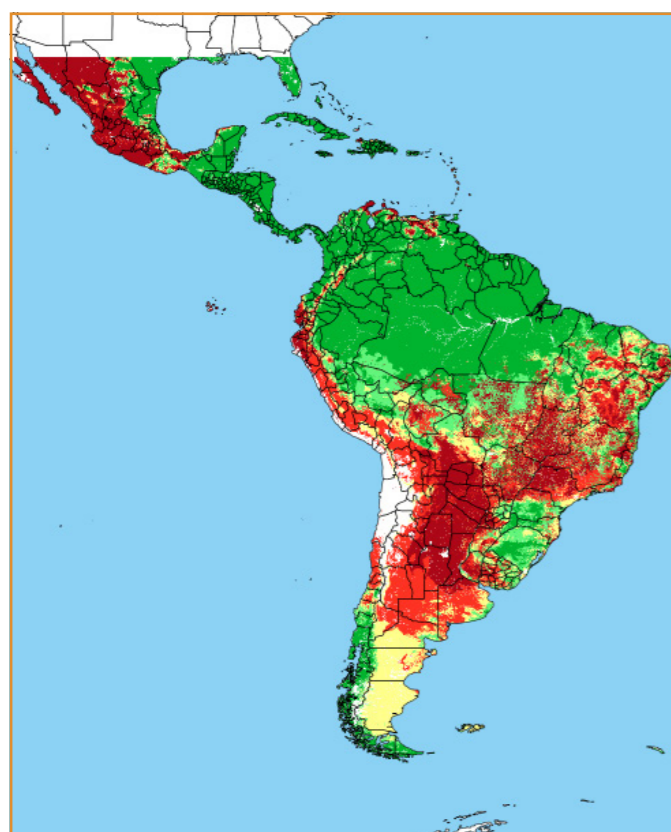
segunda-feira, 25 de maio



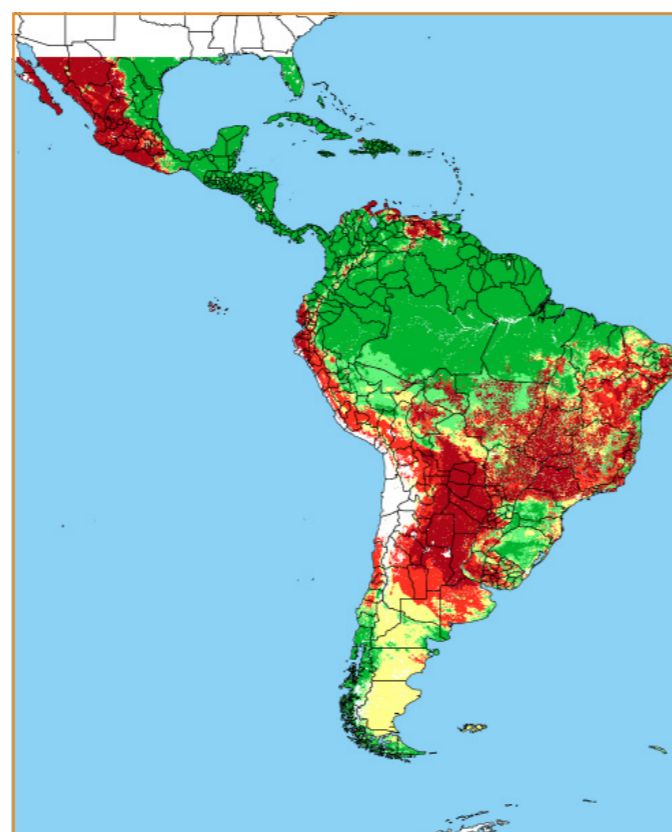
terça-feira, 26 de maio



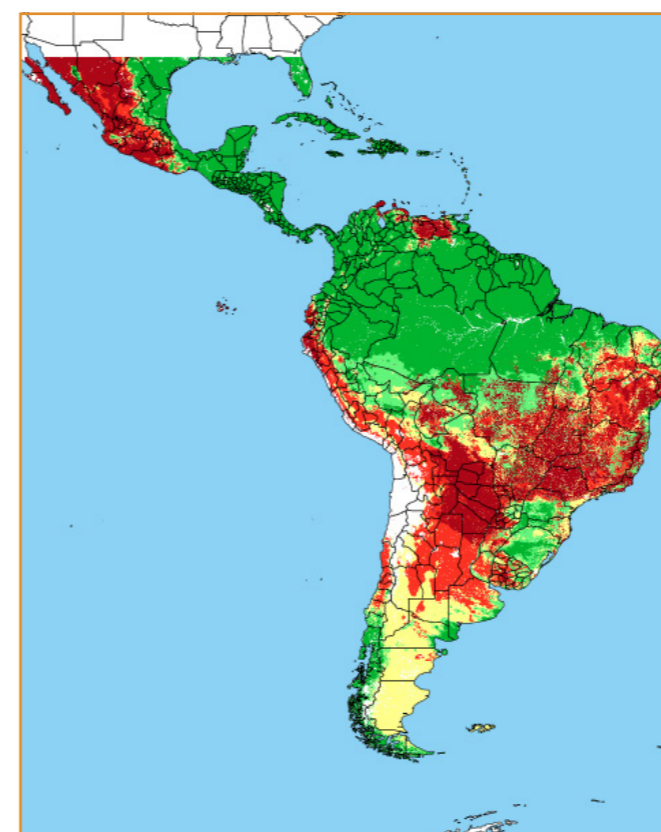
quarta-feira, 27 de maio



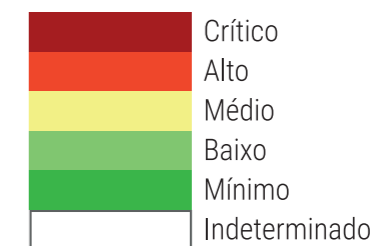
quinta-feira, 28 de maio



sexta-feira, 29 de maio

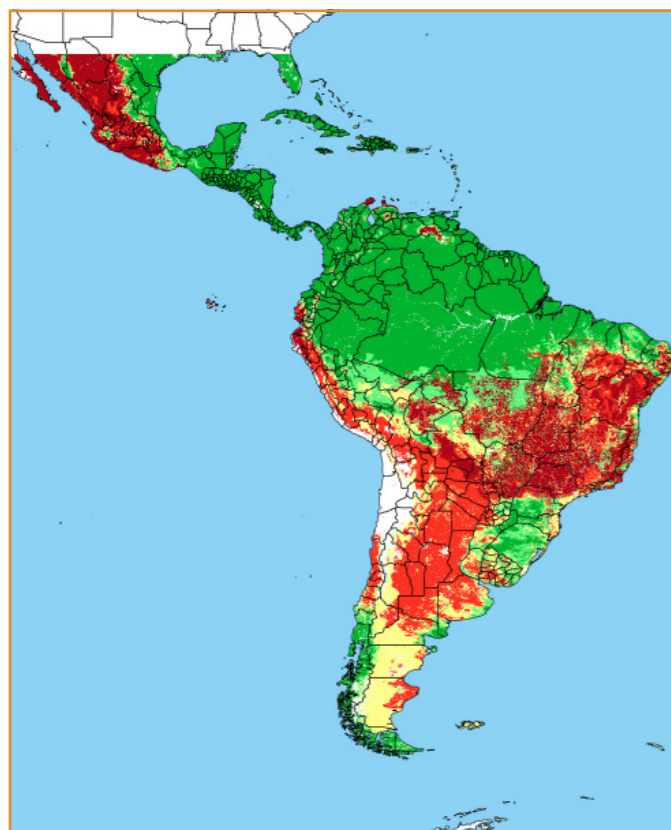


sábado, 30 de maio

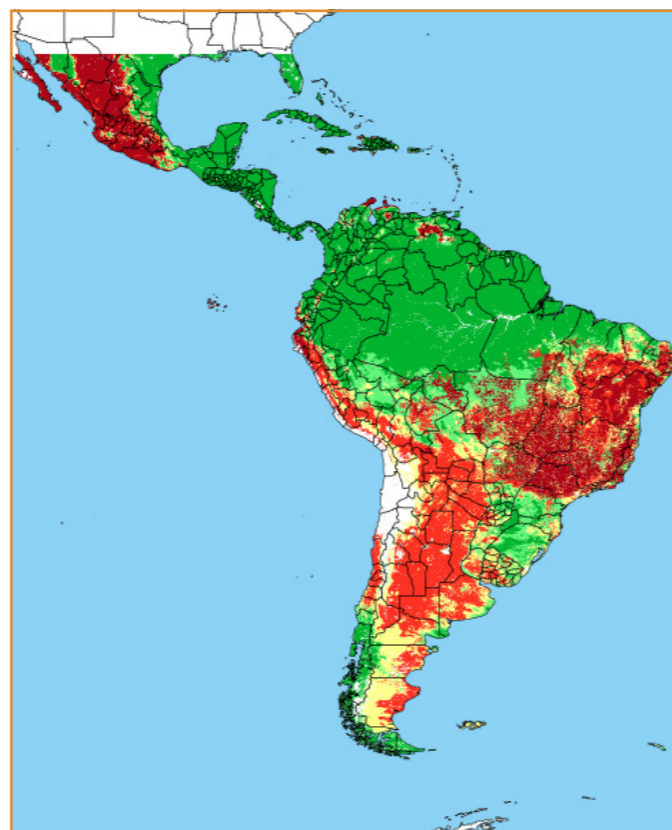


MAIO / 2020						
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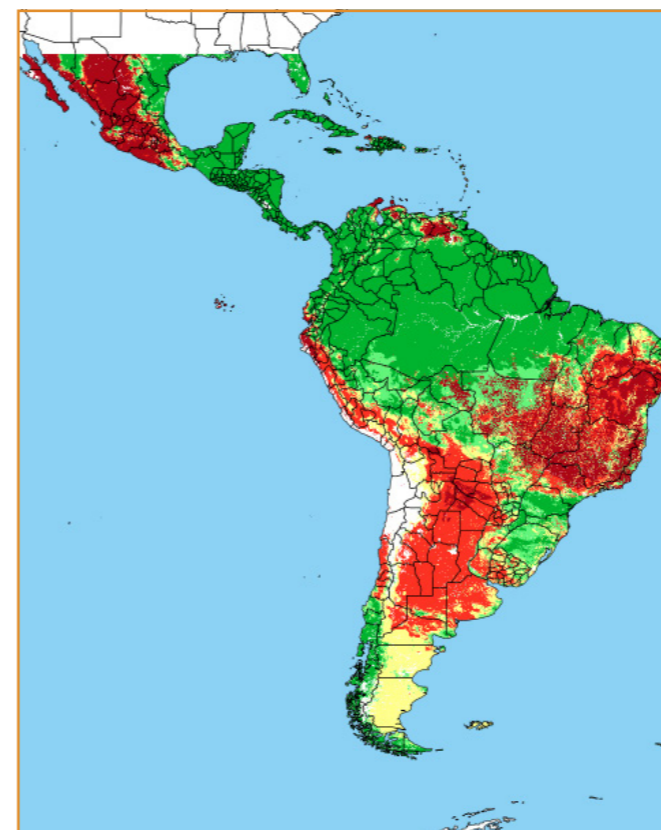
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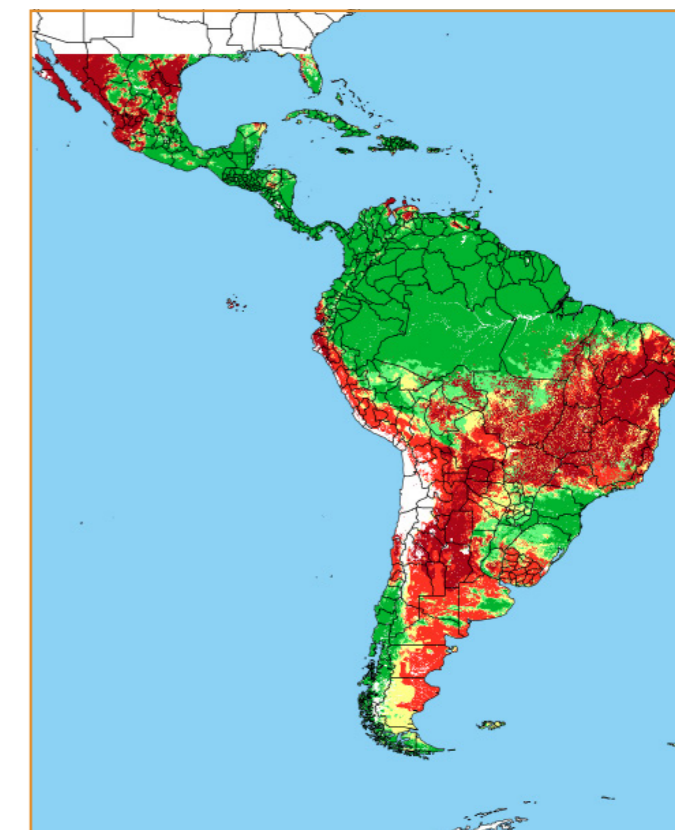
domingo, 31 de maio



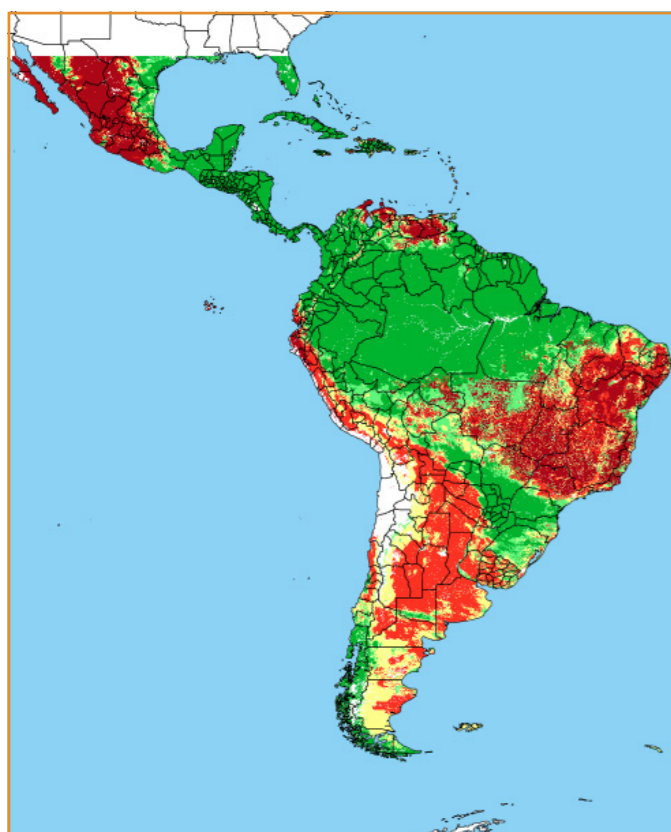
segunda-feira, 1 de junho



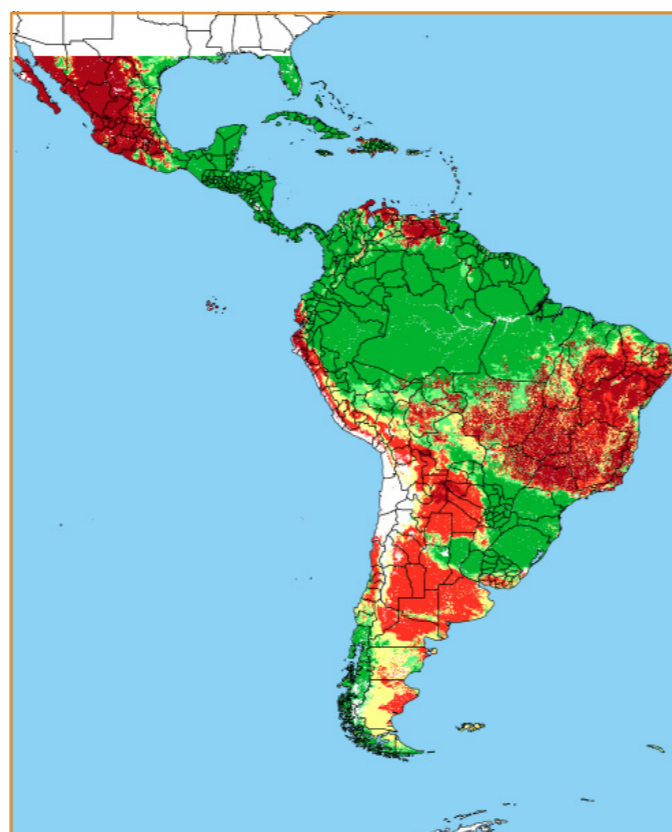
terça-feira, 2 de junho



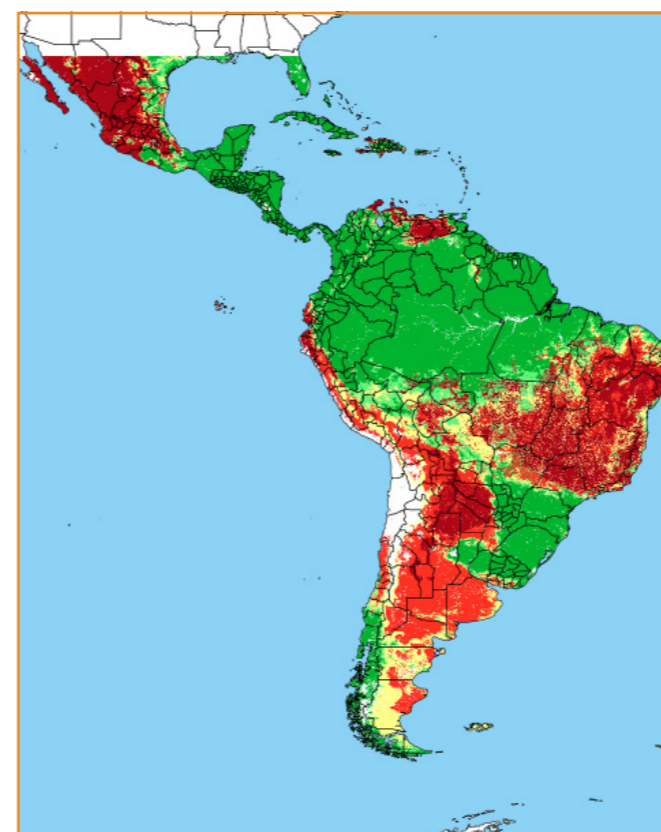
quarta-feira, 3 de junho



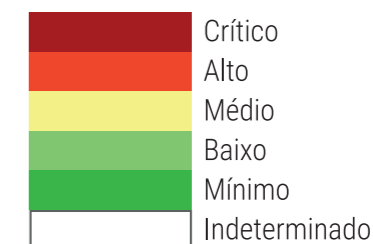
quinta-feira, 4 de junho



sexta-feira, 5 de junho



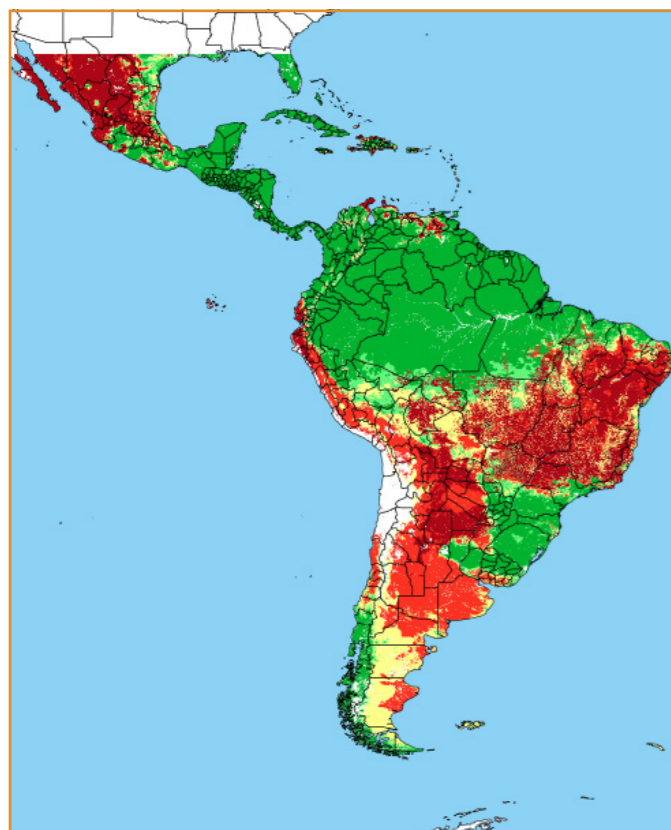
sábado, 6 de junho



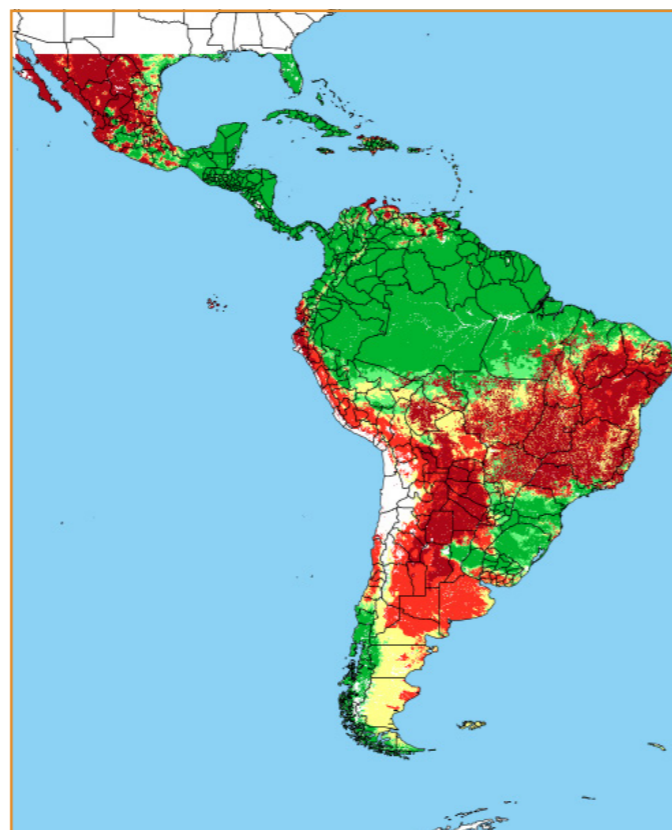
**JUNHO / 2020**

D	S	T	Q	Q	S	S
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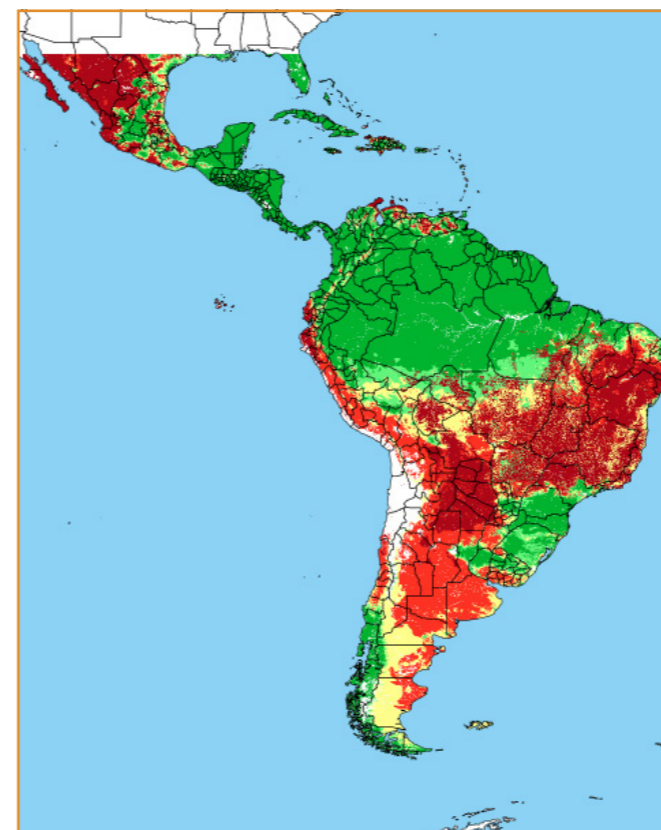
**CALENDÁRIO JULIANO**



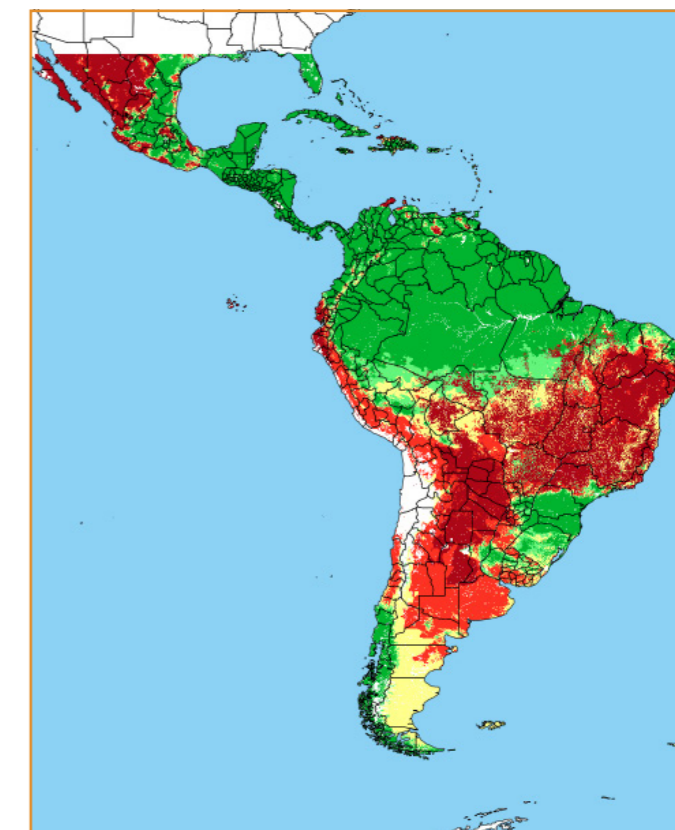
domingo, 7 de junho



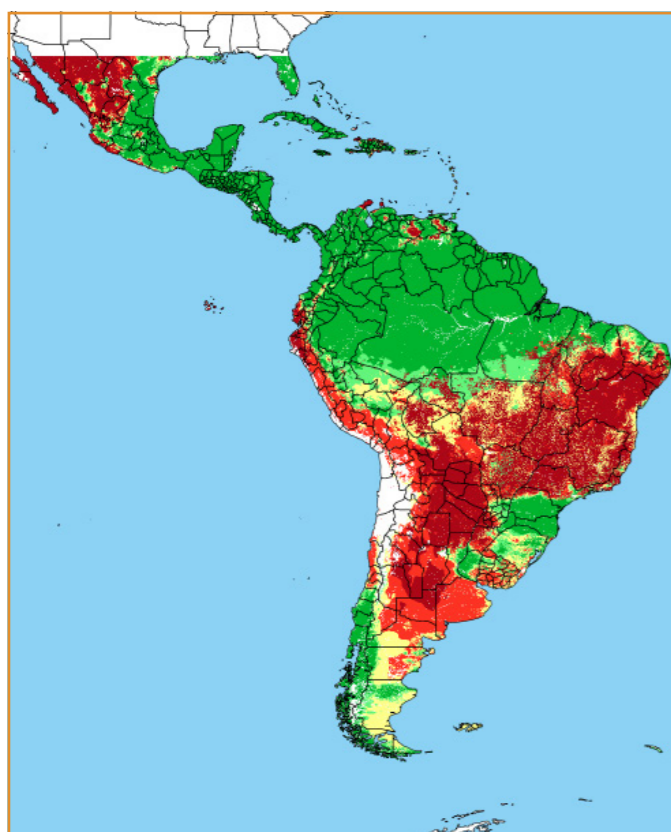
segunda-feira, 8 de junho



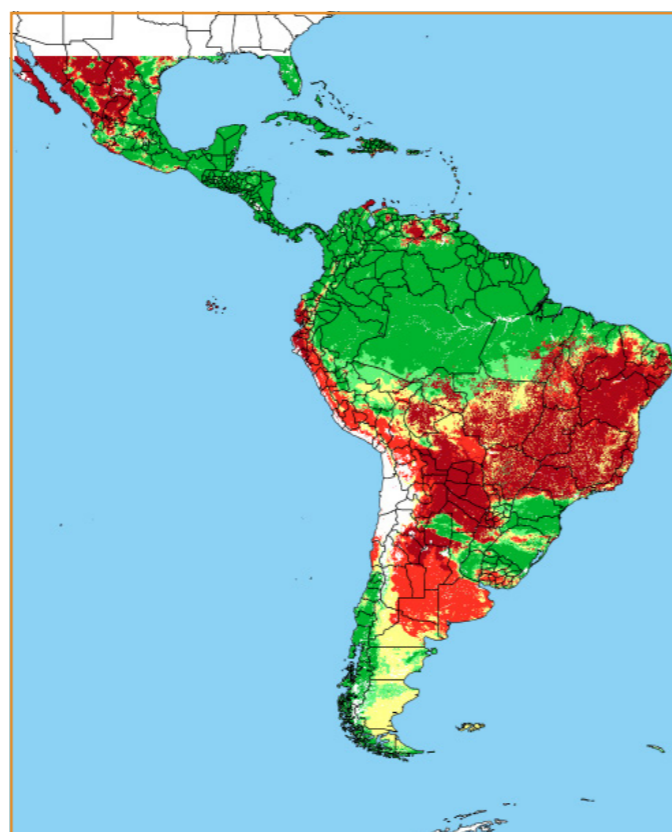
terça-feira, 9 de junho



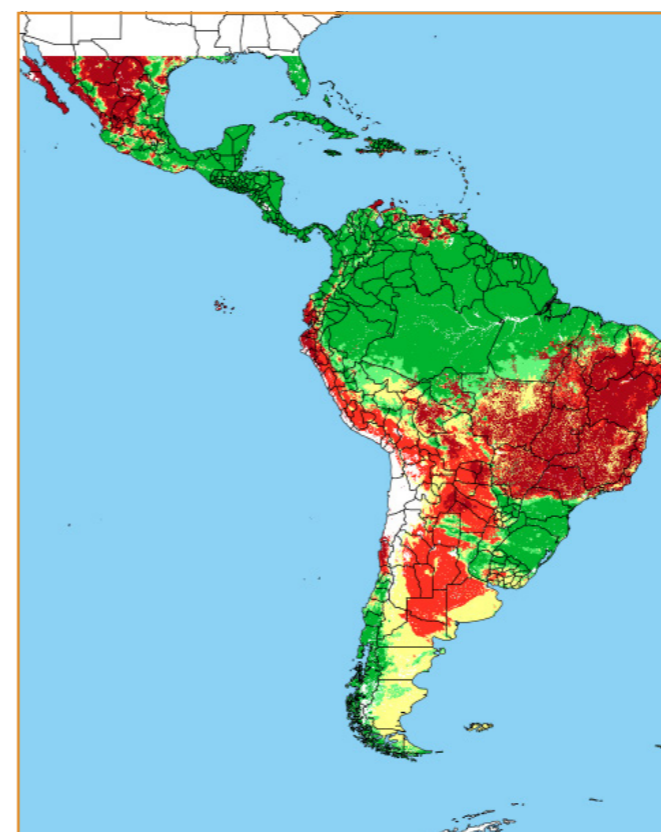
quarta-feira, 10 de junho



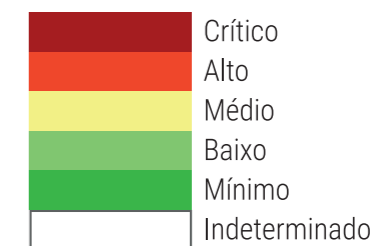
quinta-feira, 11 de junho



sexta-feira, 12 de junho



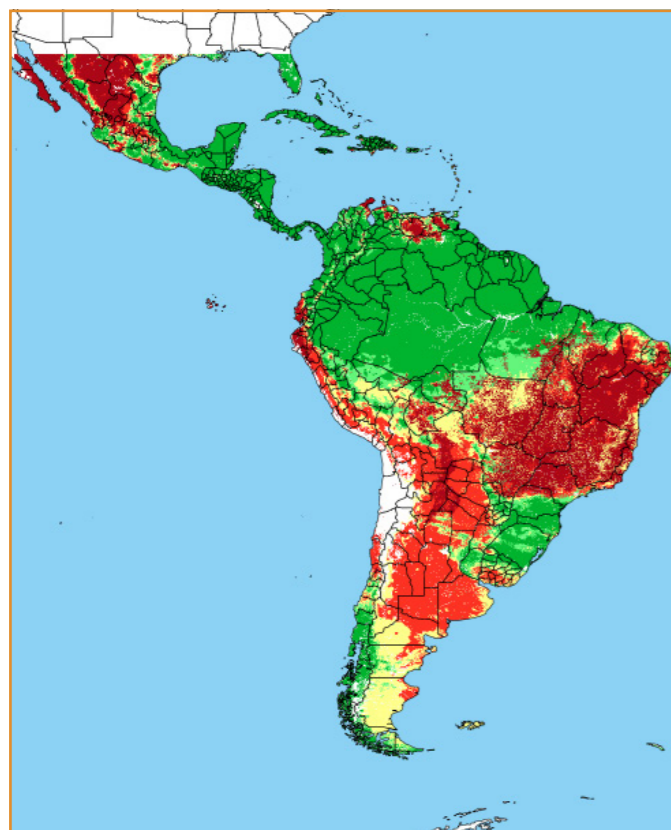
sábado, 13 de junho



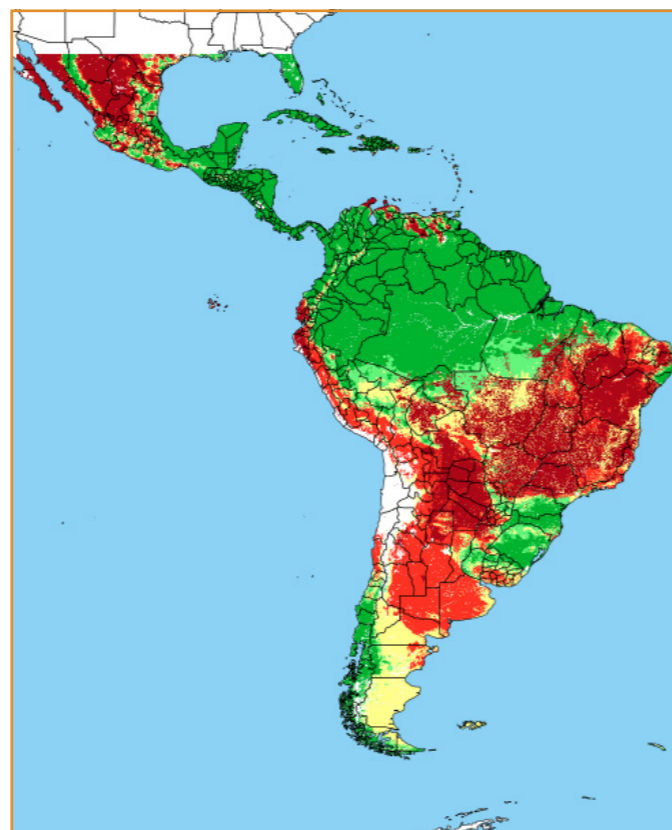
JUNHO / 2020

D	S	T	Q	Q	S	S
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173	174	175	176	177	178	179
180	181	182				

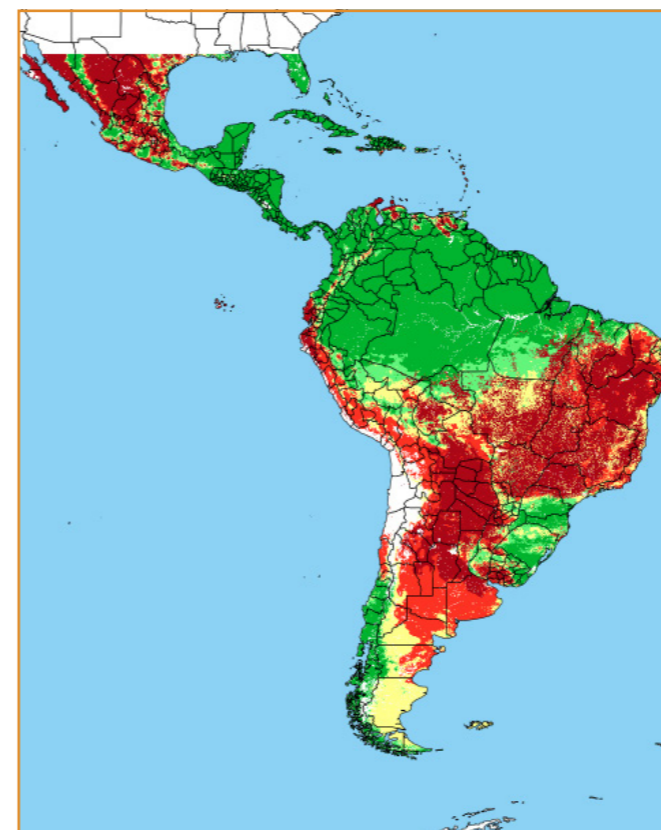
CALENDÁRIO JULIANO



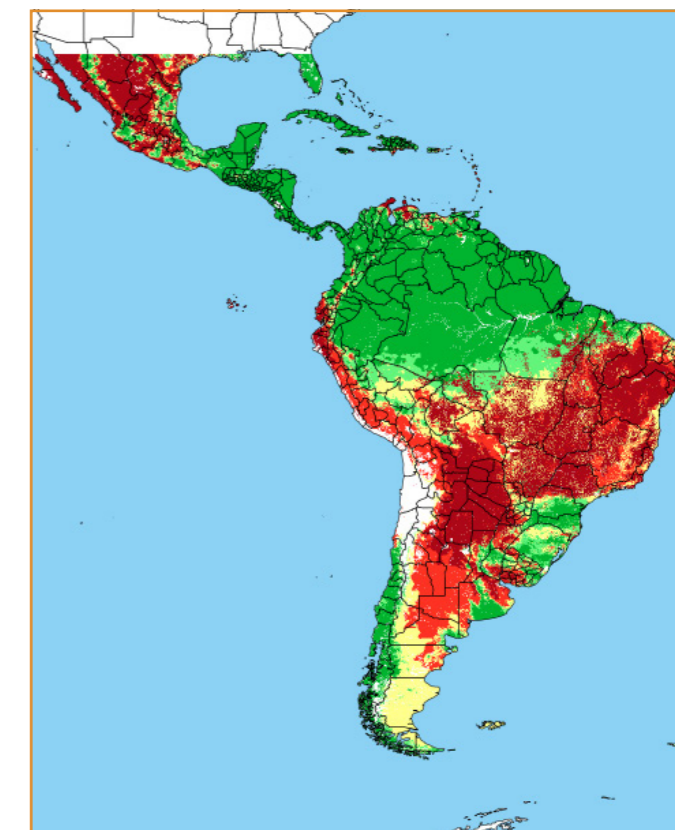
domingo, 14 de junho



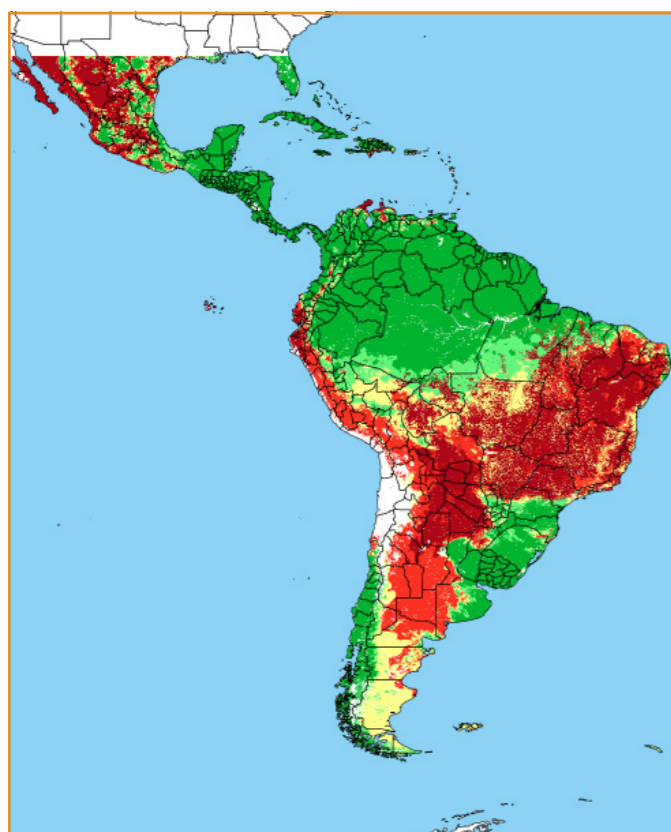
segunda-feira, 15 de junho



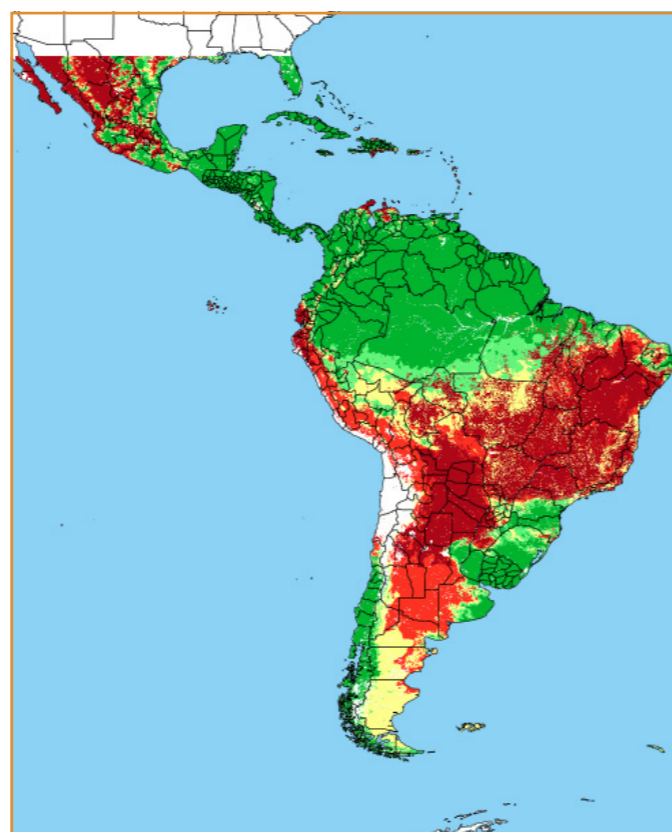
terça-feira, 16 de junho



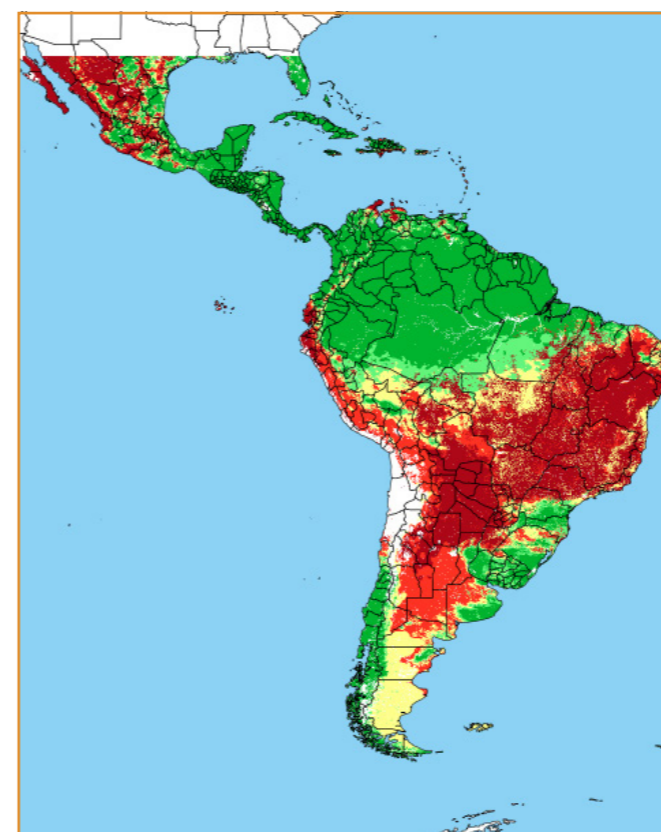
quarta-feira, 17 de junho



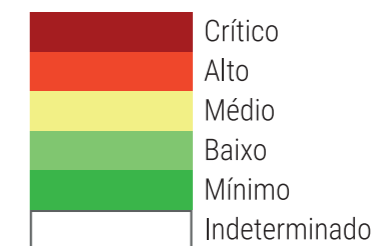
quinta-feira, 18 de junho



sexta-feira, 19 de junho

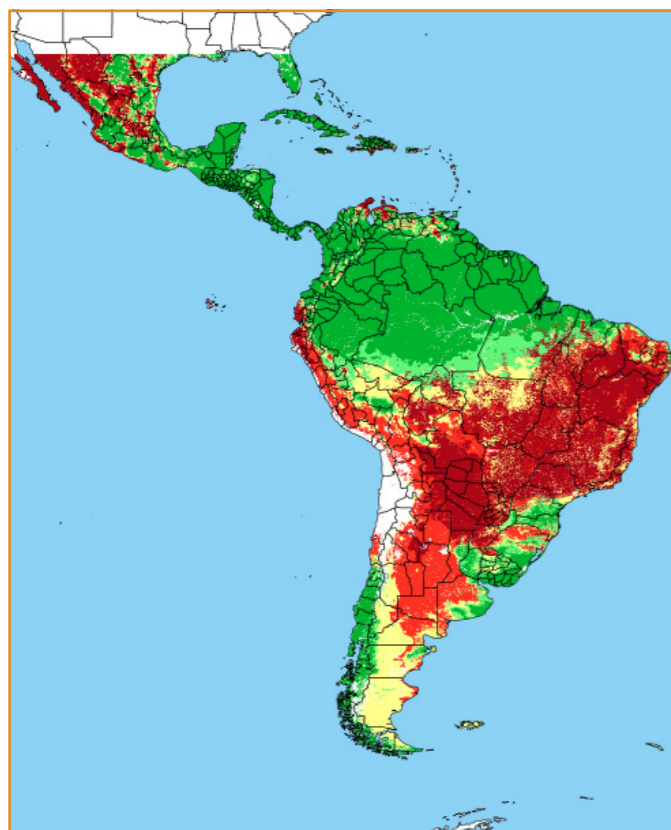


sábado, 20 de junho

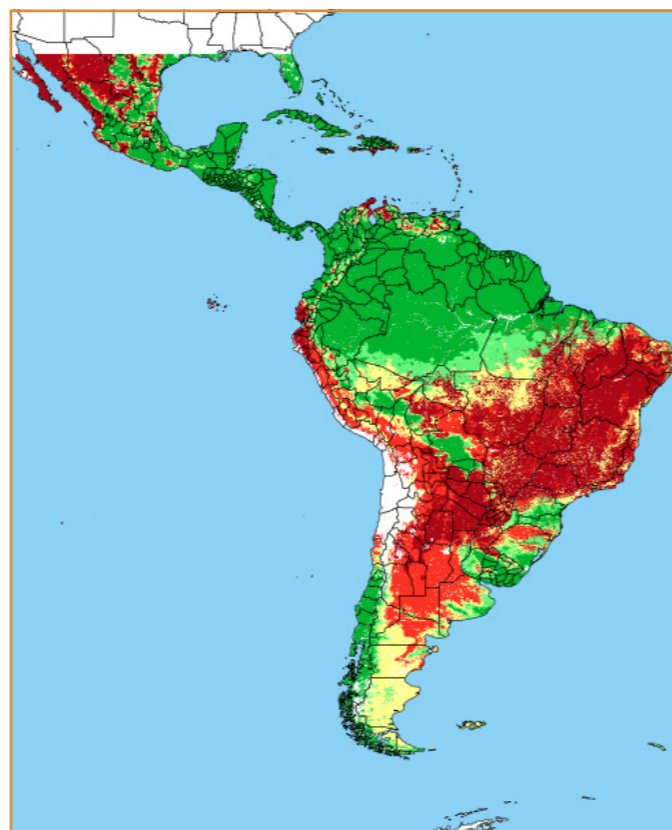


JUNHO / 2020						
D	S	T	Q	Q	S	S
	153	154	155	156	157	158
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166	167	168	169	170	171	172
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180	181	182				

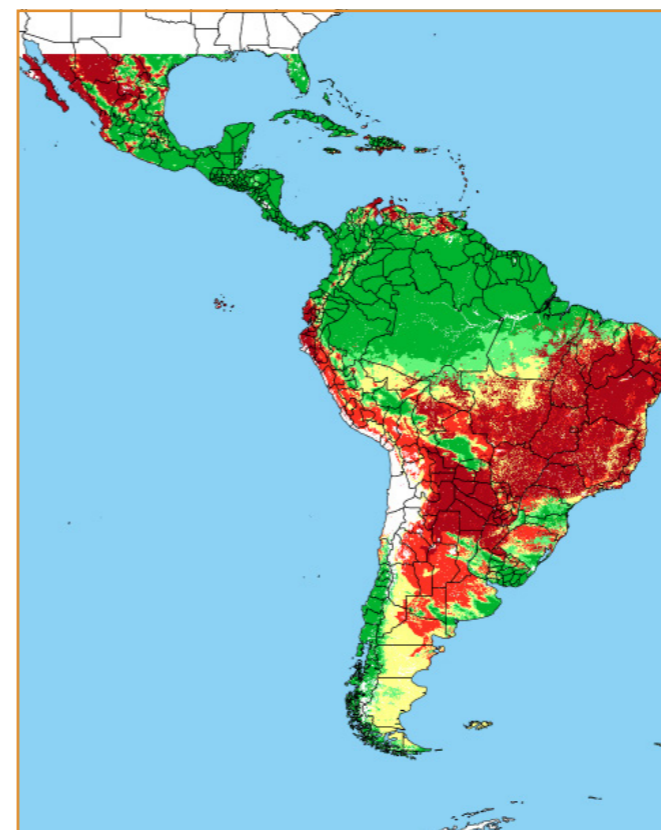
CALENDÁRIO JULIANO



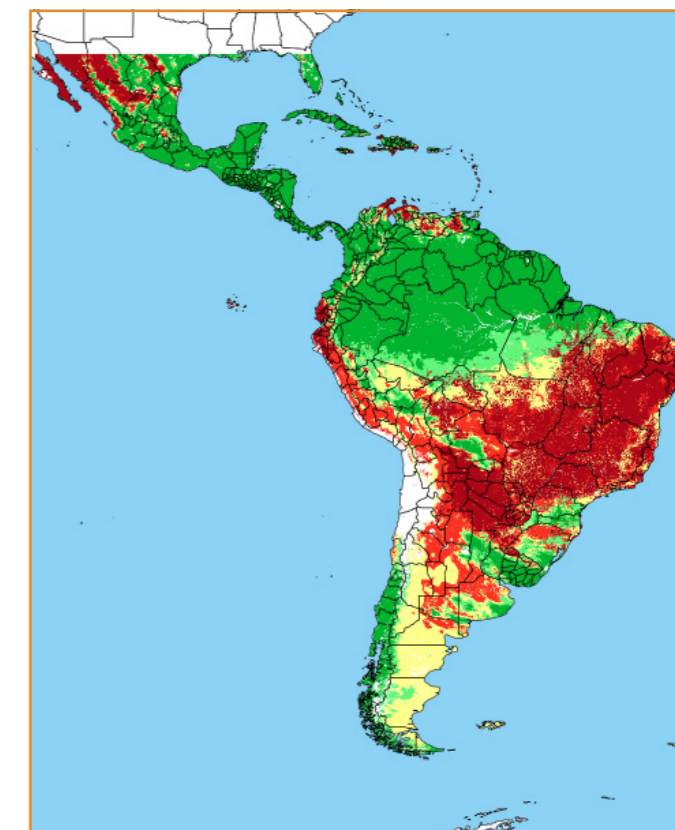
domingo, 21 de junho



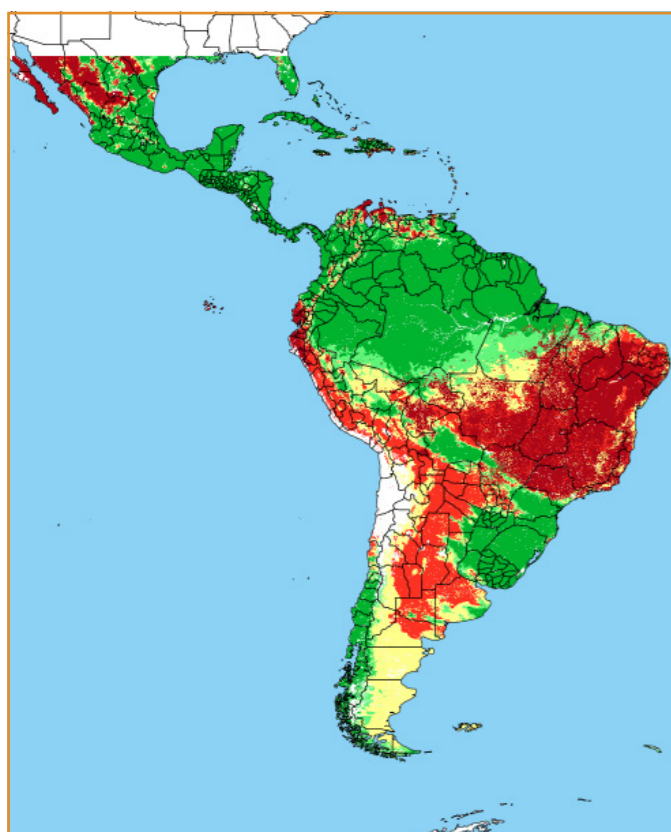
segunda-feira, 22 de junho



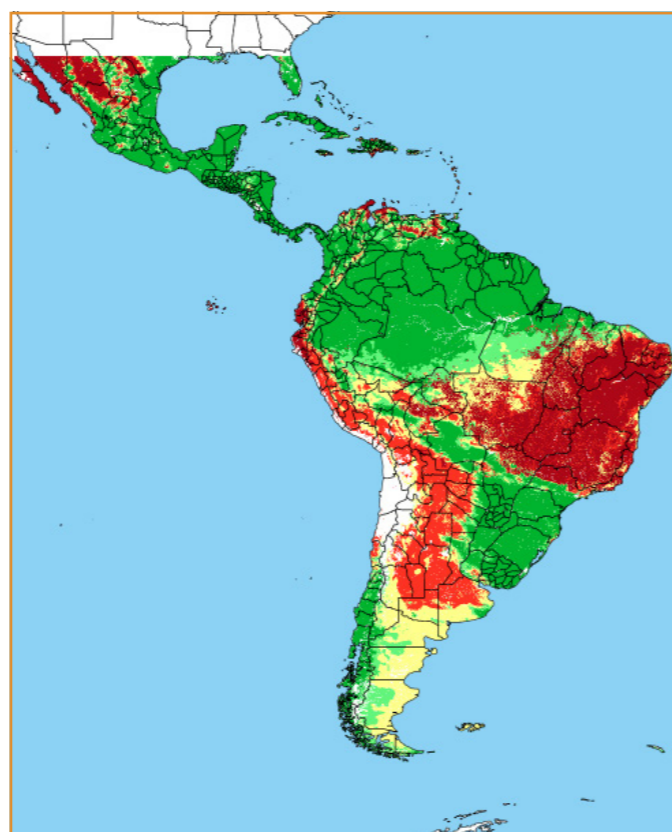
terça-feira, 23 de junho



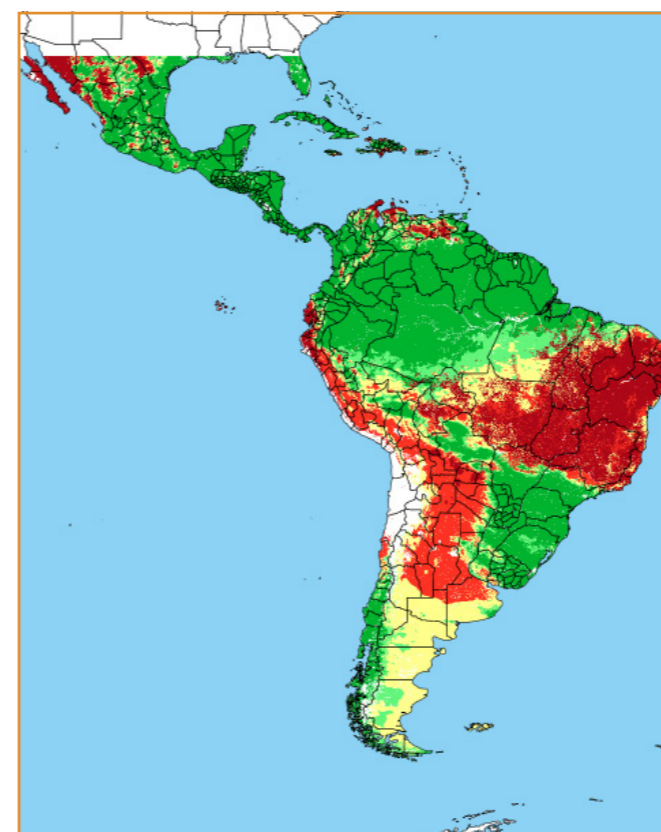
quarta-feira, 24 de junho



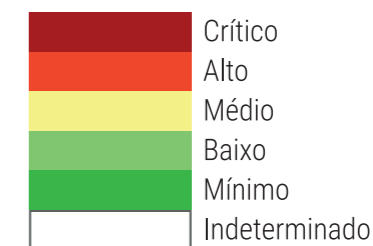
quinta-feira, 25 de junho



sexta-feira, 26 de junho



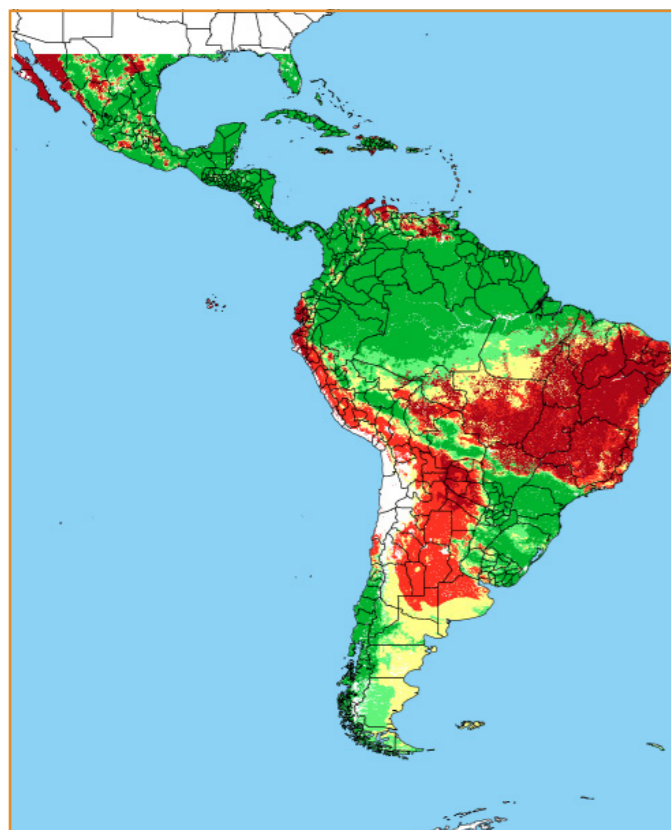
sábado, 27 de junho



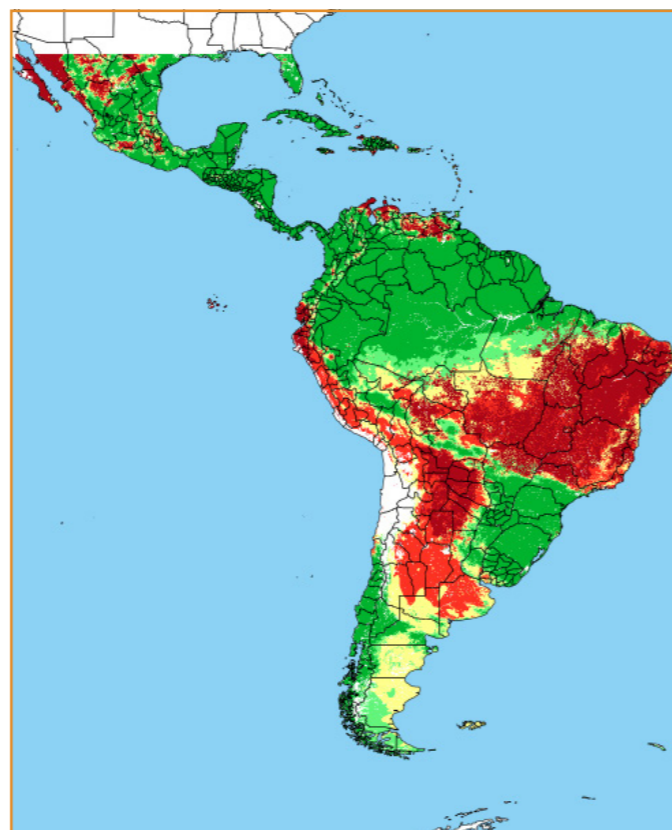
JUNHO / 2020						
D	S	T	Q	Q	S	S
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159	160	161	162	163	164	165
166	167	168	169	170	171	172
173	174	175	176	177	178	179
180	181	182				

CALENDÁRIO JULIANO

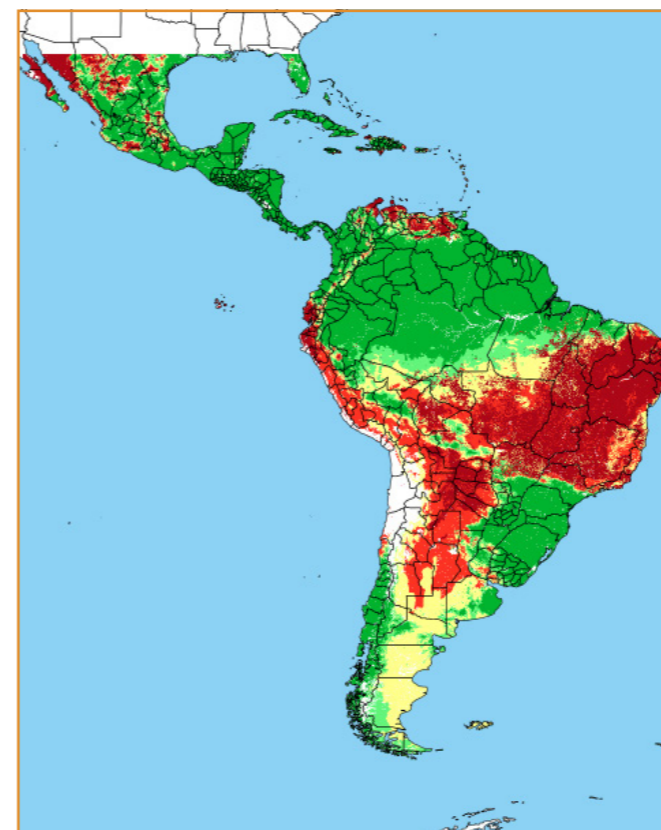




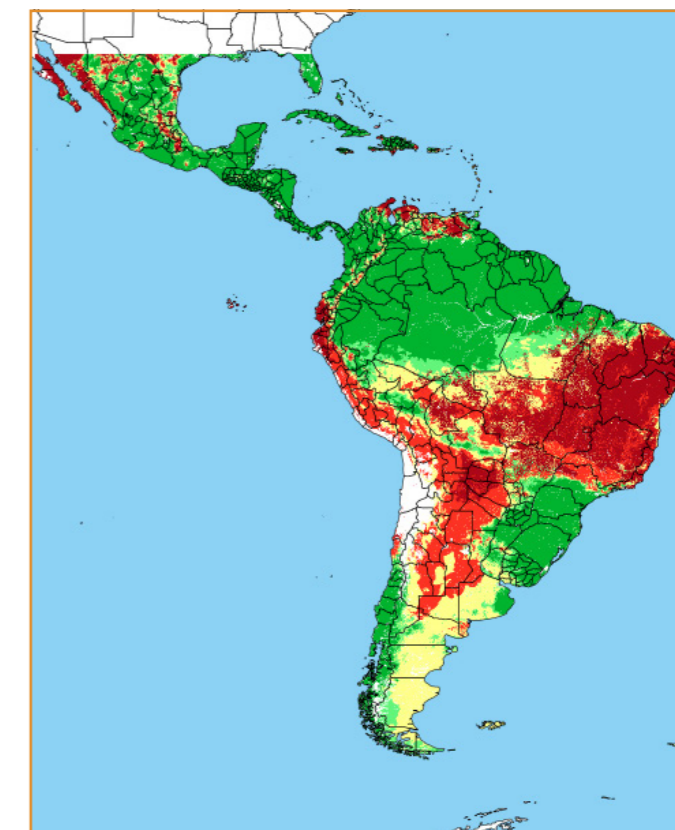
domingo, 28 de junho



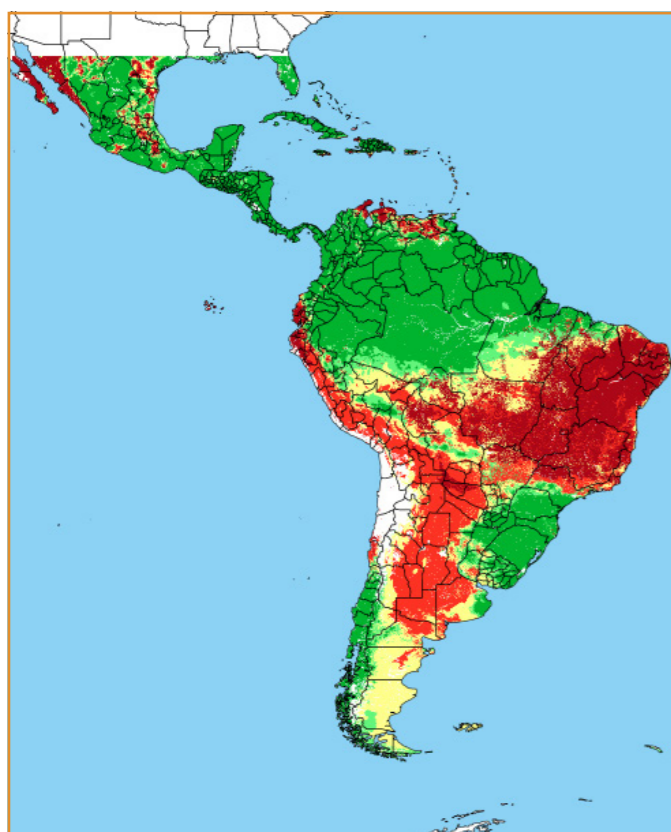
segunda-feira, 29 de junho



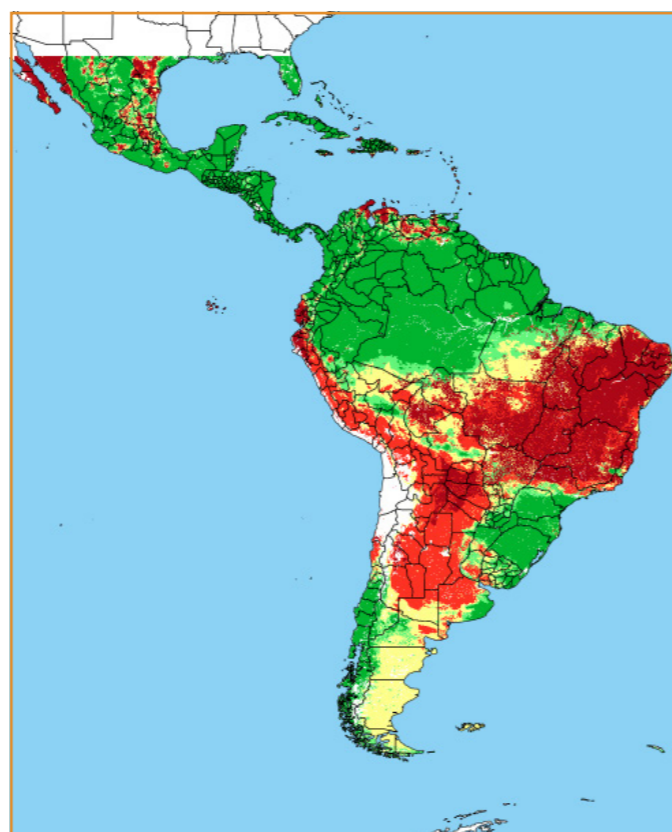
terça-feira, 30 de junho



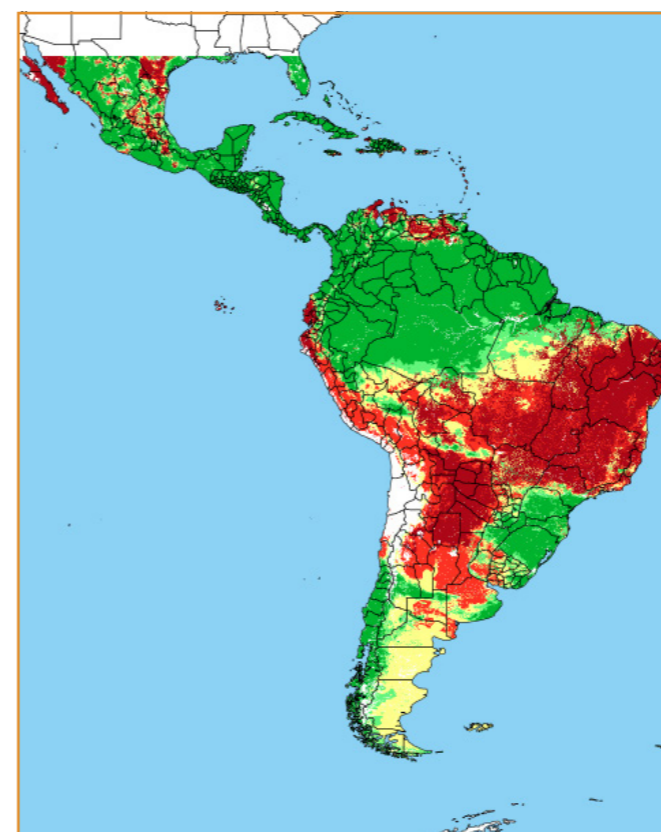
quarta-feira, 1 de julho



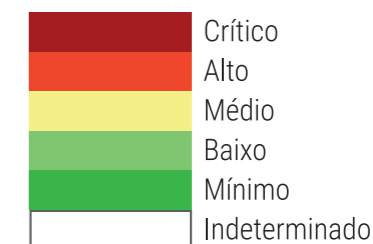
quinta-feira, 2 de julho



sexta-feira, 3 de julho



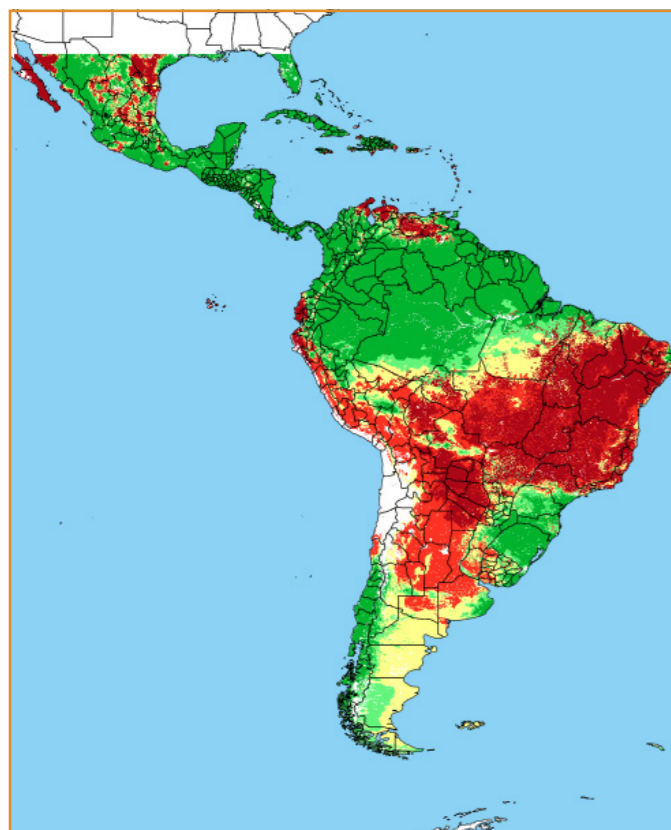
sábado, 4 de julho



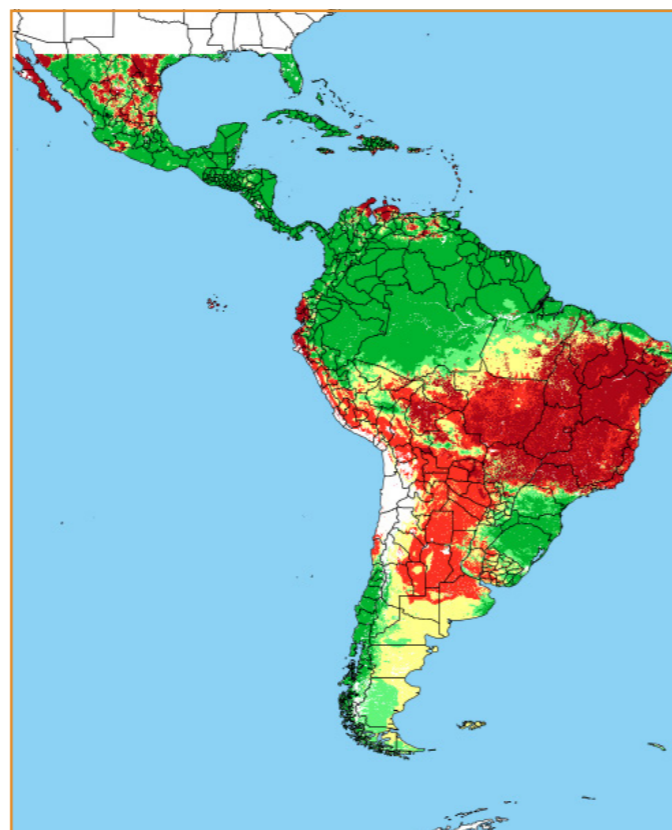
JULHO / 2020

D	S	T	Q	Q	S	S
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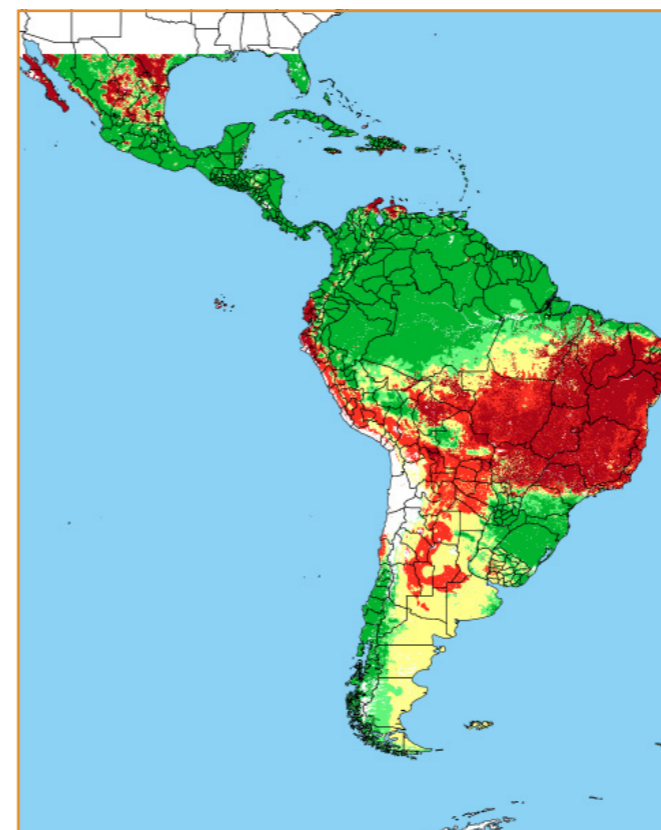
CALENDÁRIO JULIANO



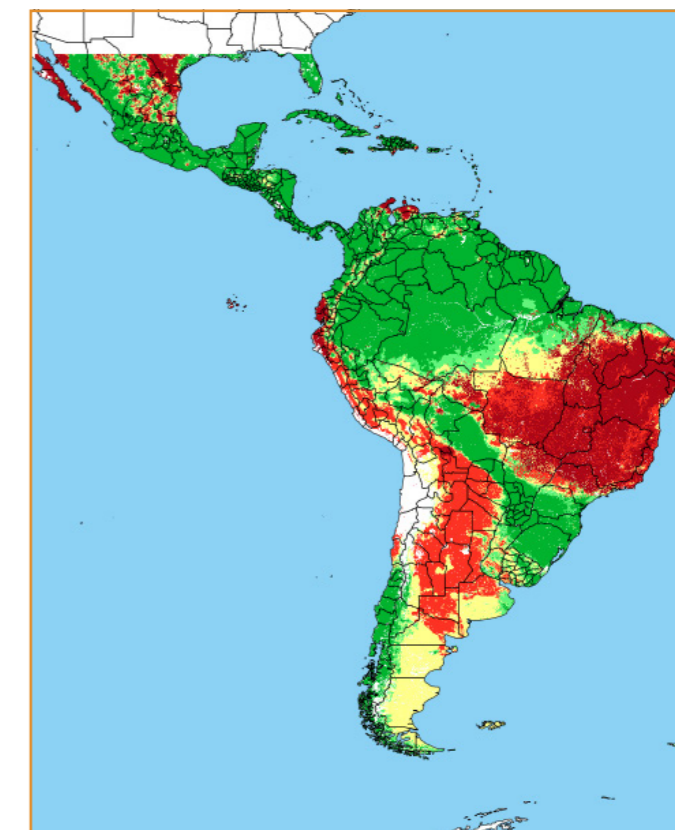
domingo, 5 de julho



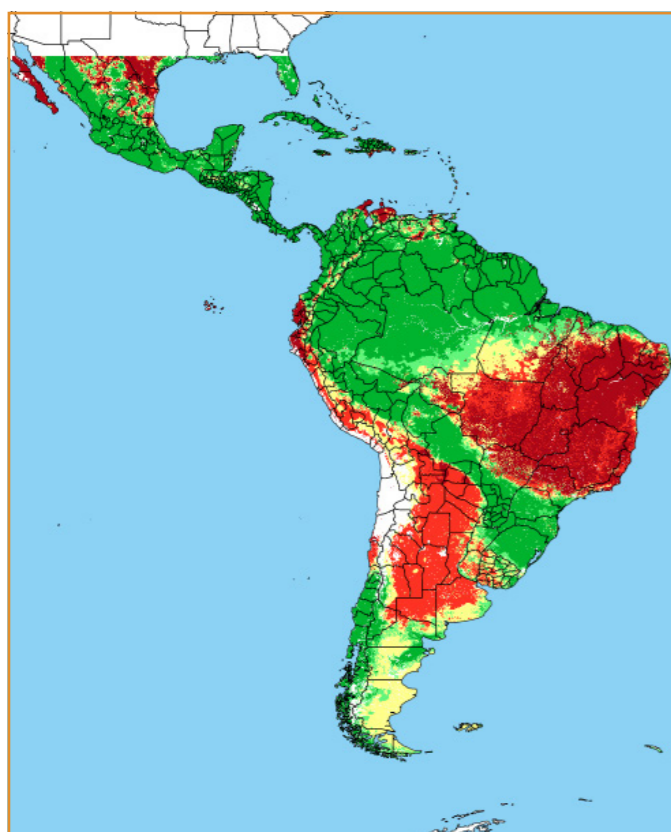
segunda-feira, 6 de julho



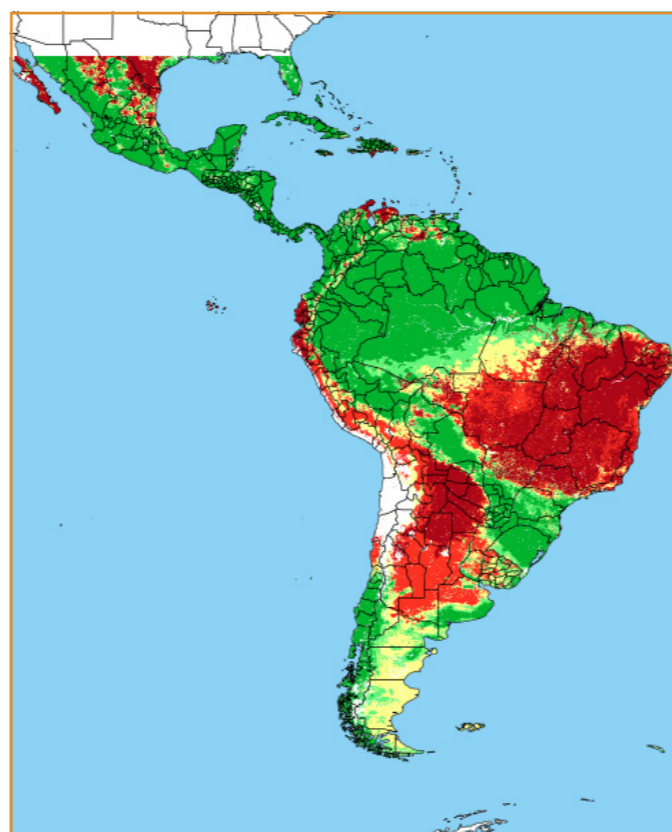
terça-feira, 7 de julho



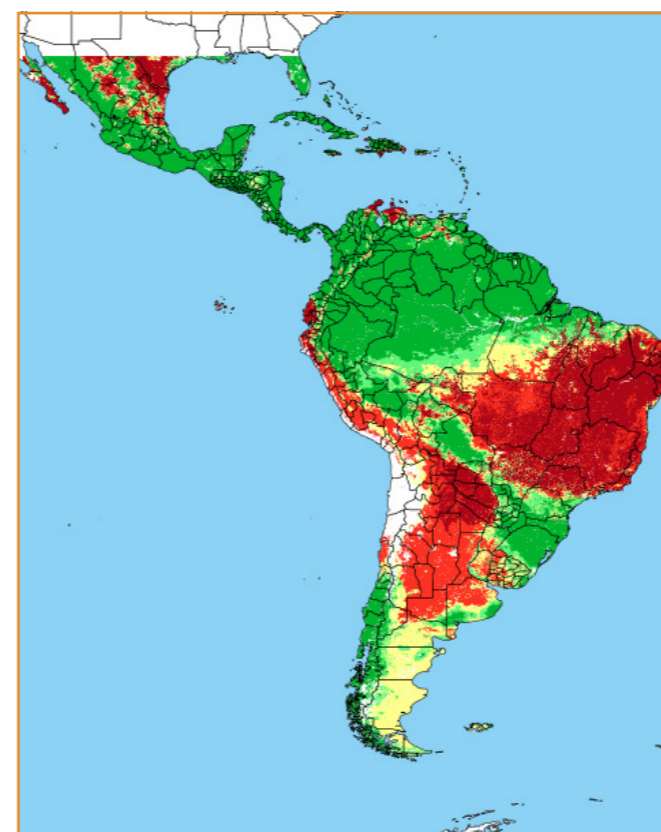
quarta-feira, 8 de julho



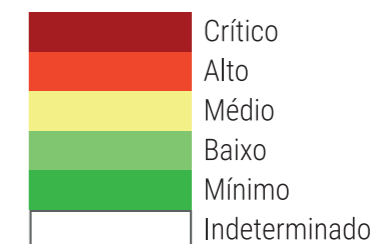
quinta-feira, 9 de julho



sexta-feira, 10 de julho



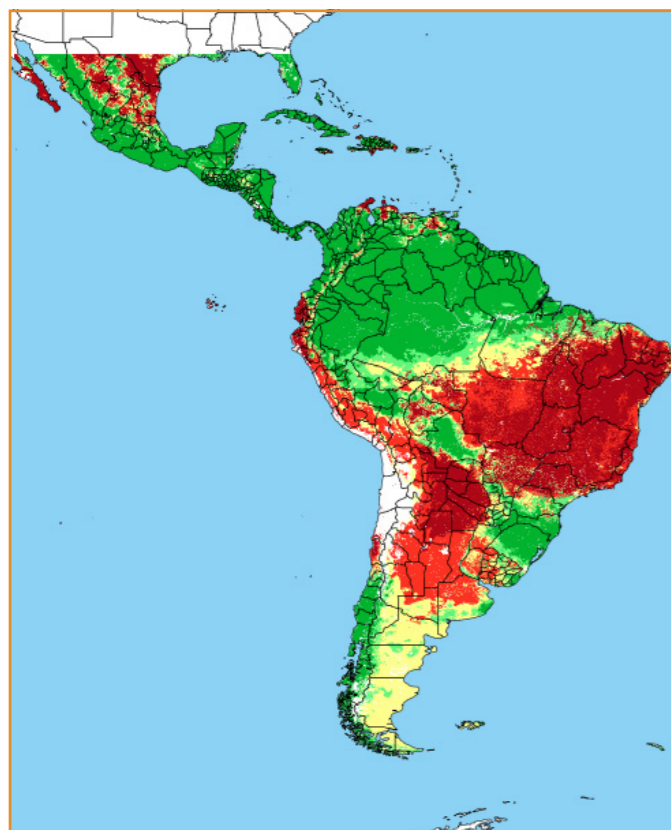
sábado, 11 de julho



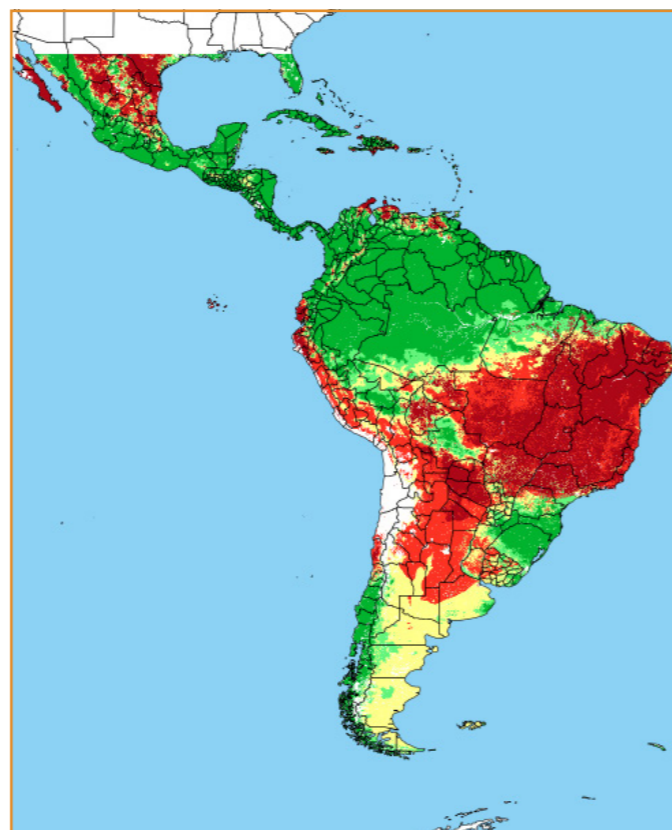
JULHO / 2020

D	S	T	Q	Q	S	S
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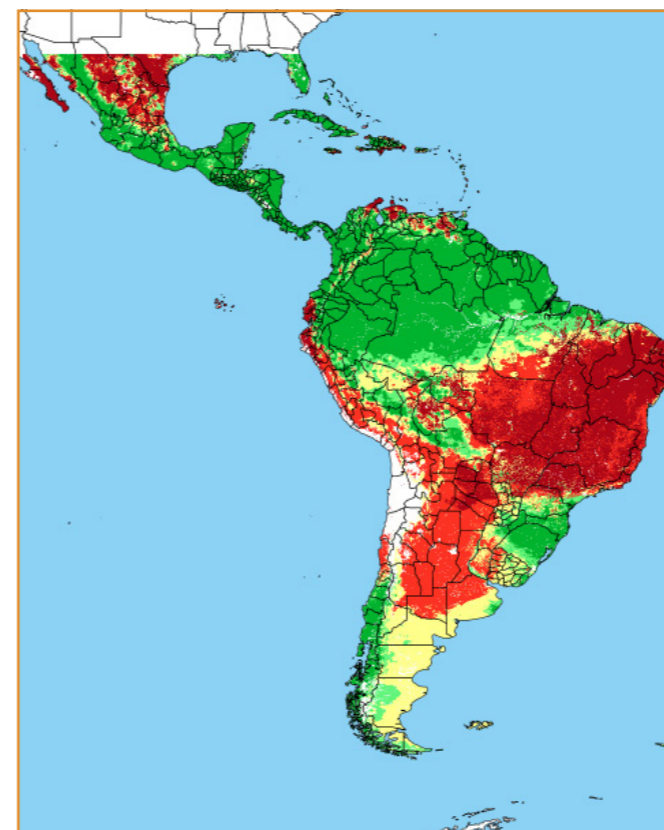
CALENDÁRIO JULIANO



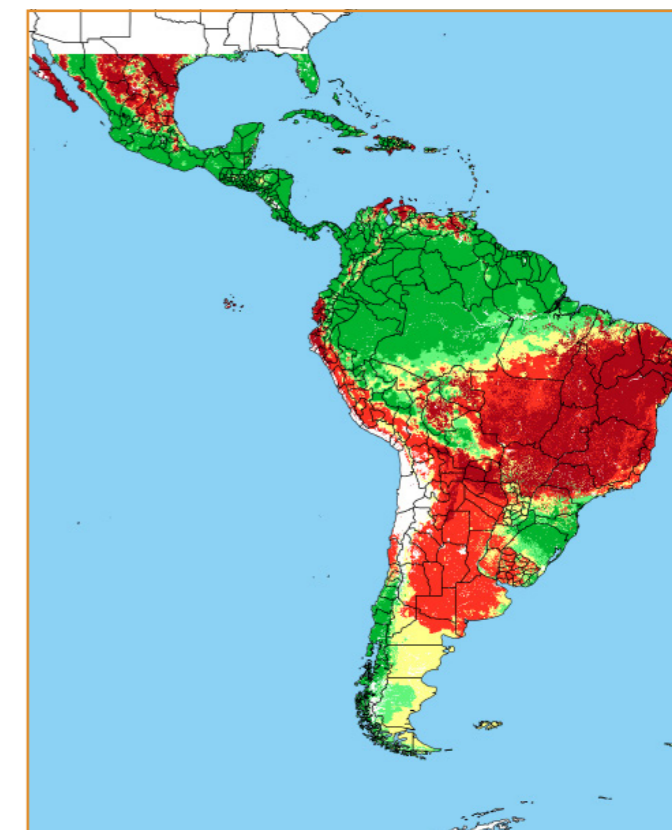
domingo, 12 de julho



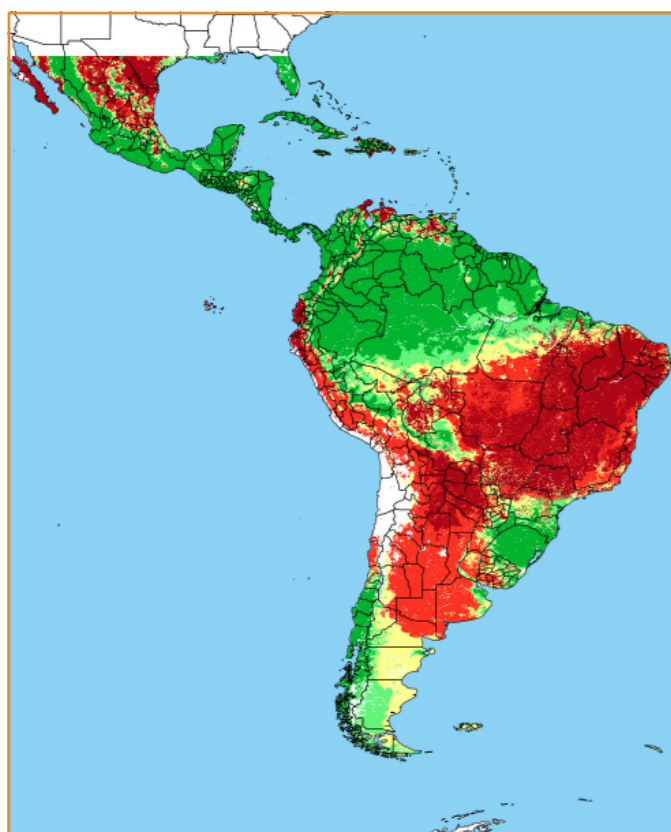
segunda-feira, 13 de julho



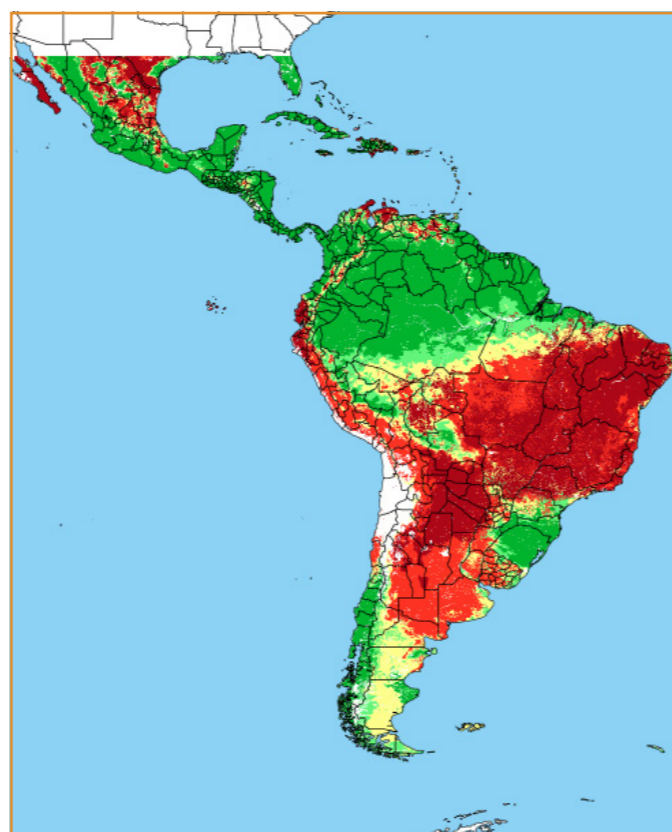
terça-feira, 14 de julho



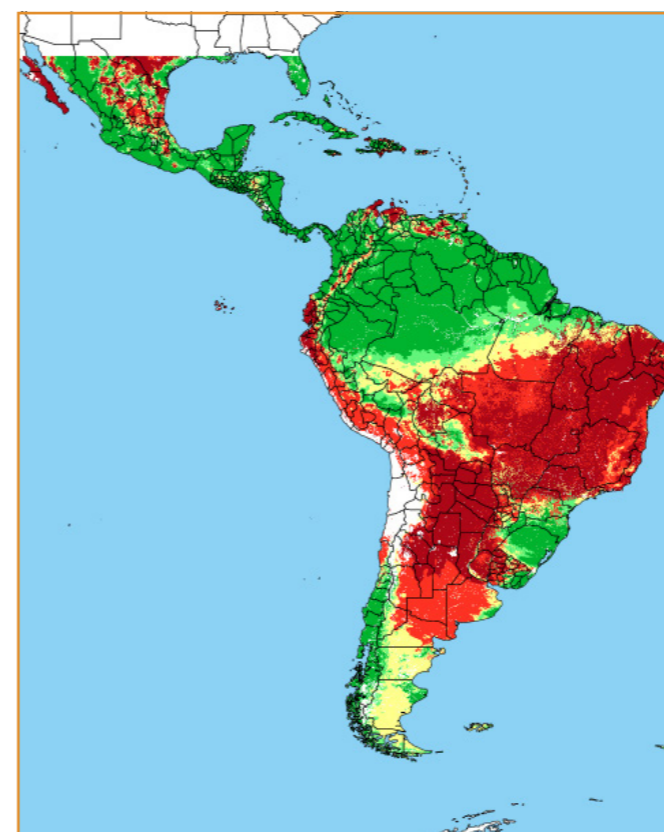
quarta-feira, 15 de julho



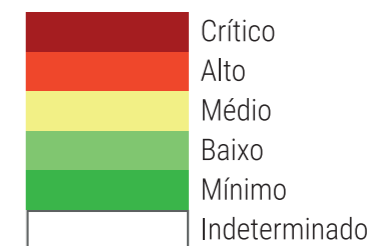
quinta-feira, 16 de julho



sexta-feira, 17 de julho



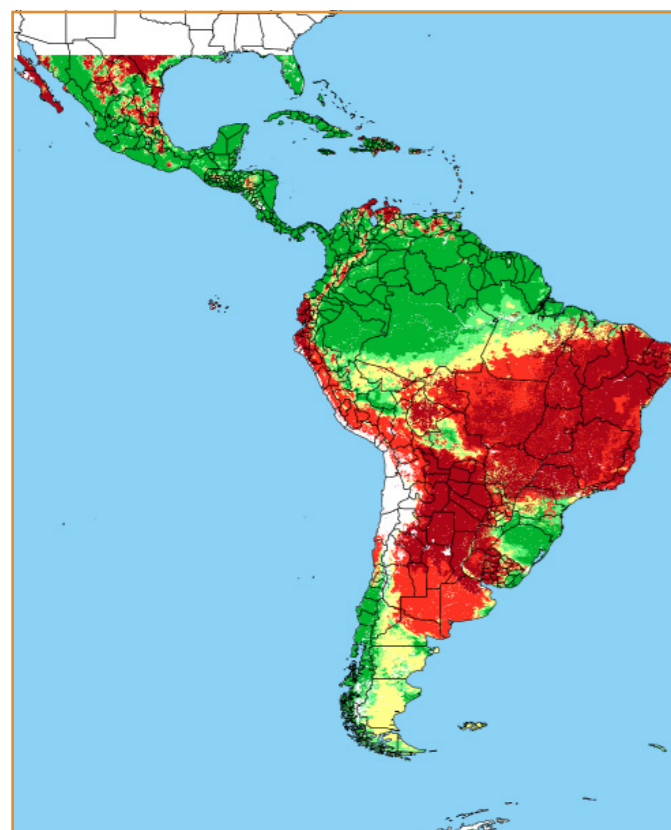
sábado, 18 de julho



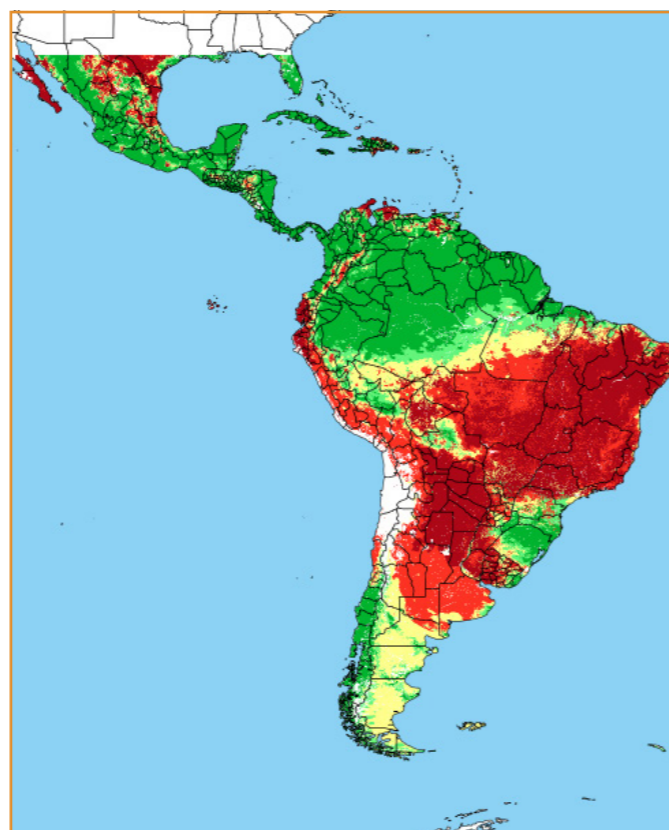
JULHO / 2020

D	S	T	Q	Q	S	S
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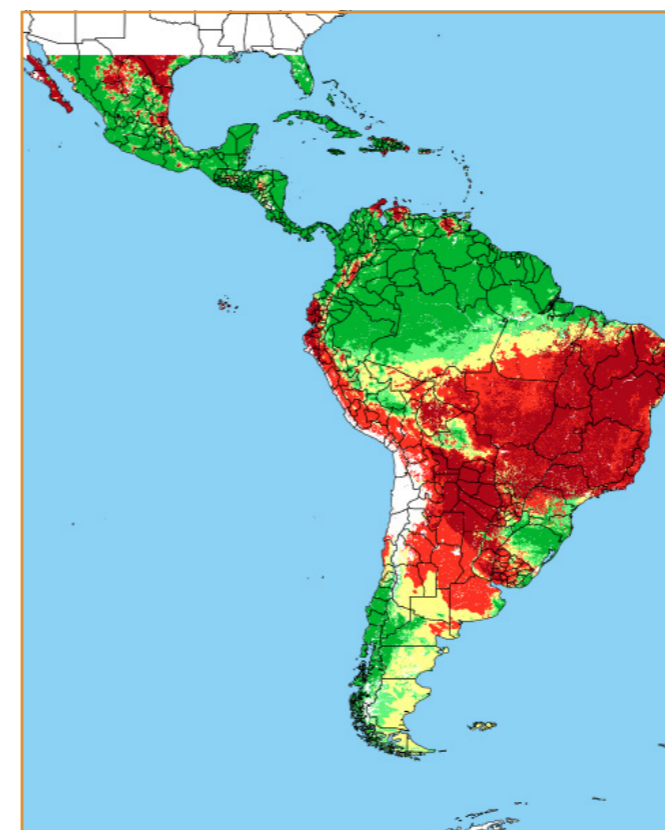
CALENDÁRIO JULIANO



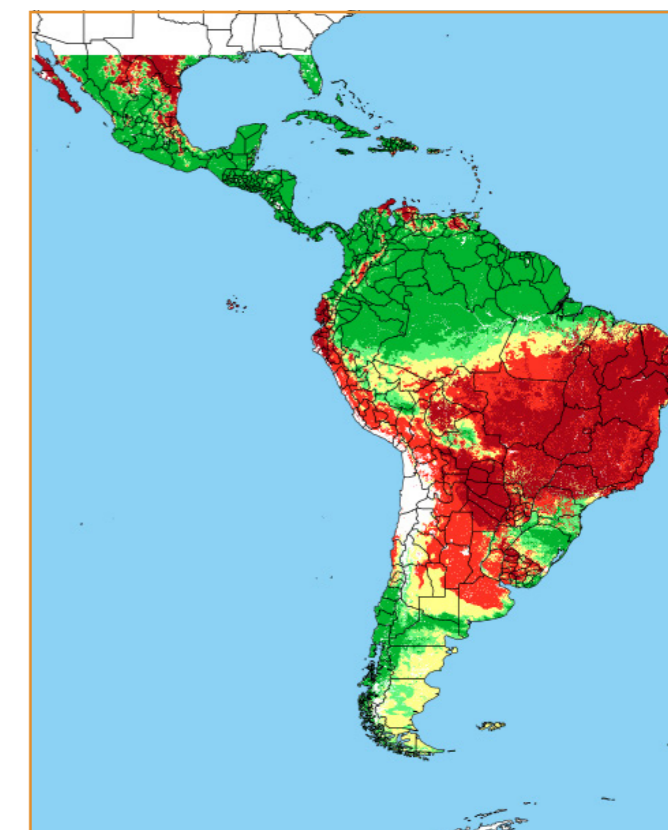
domingo, 19 de julho



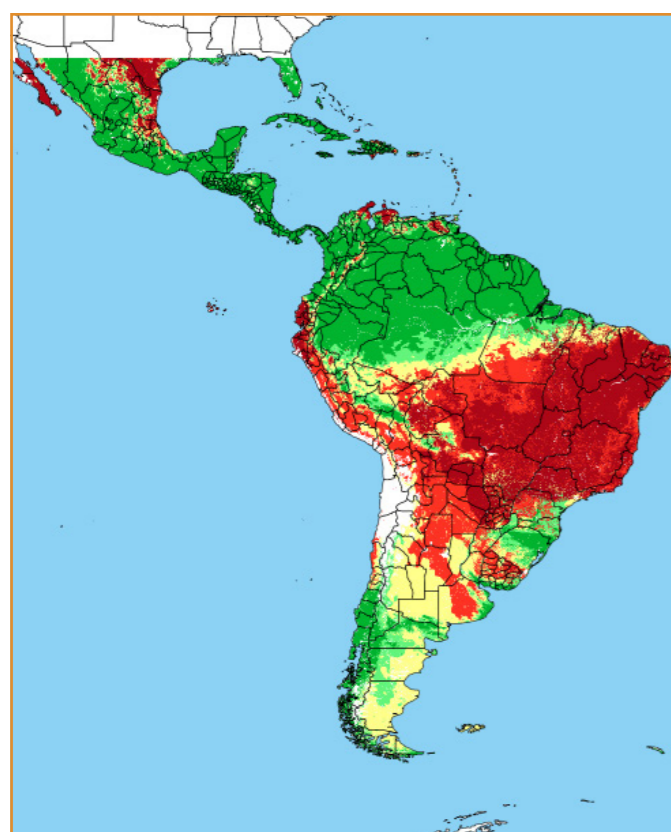
segunda-feira, 20 de julho



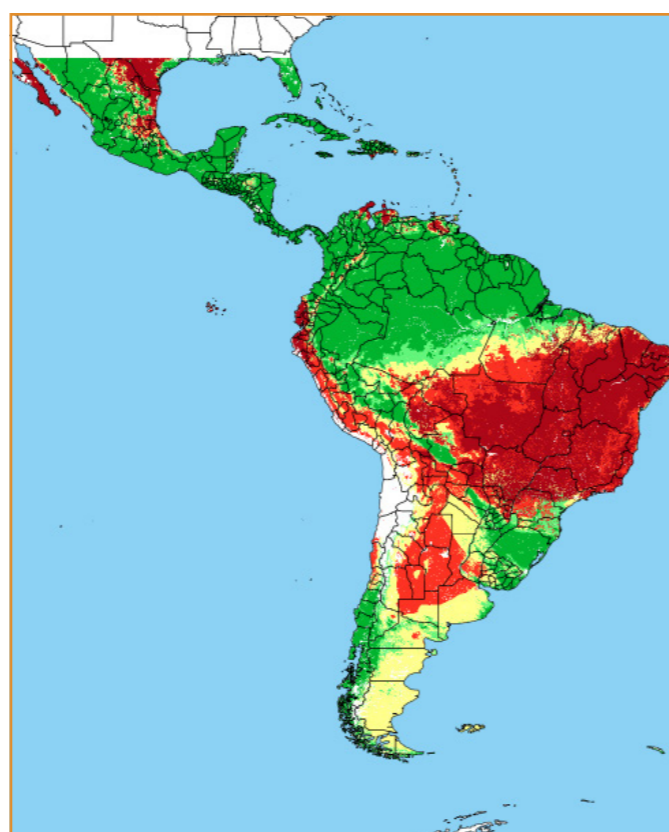
terça-feira, 21 de julho



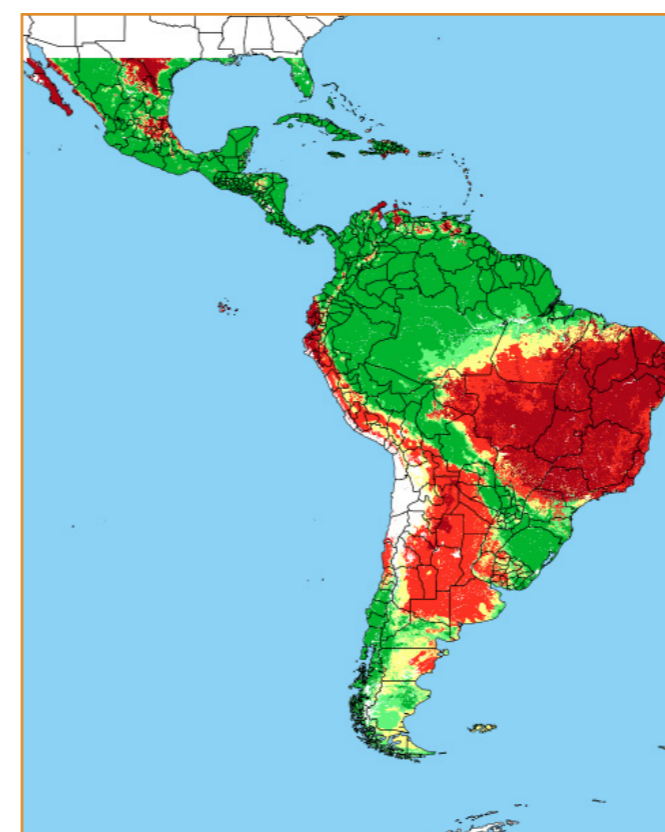
quarta-feira, 22 de julho



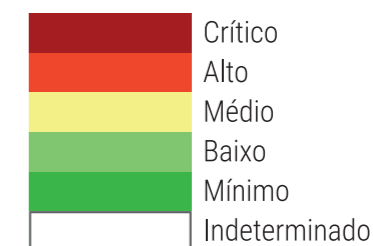
quinta-feira, 23 de julho



sexta-feira, 24 de julho



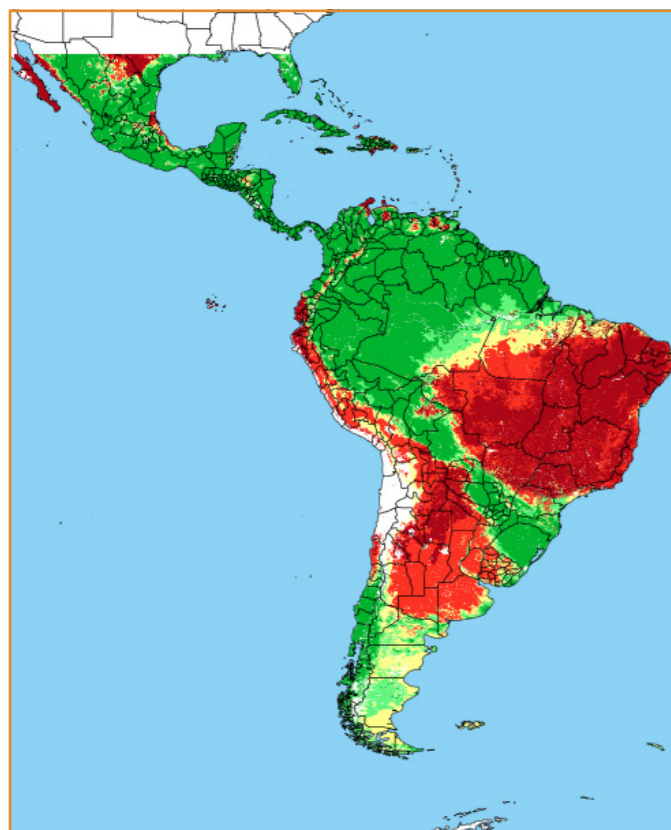
sábado, 25 de julho



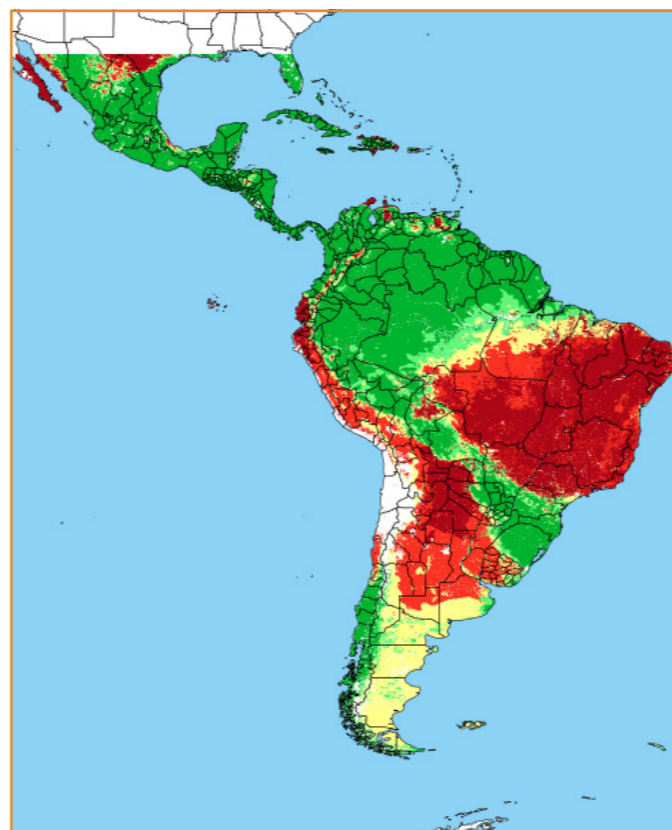
JULHO / 2020

D	S	T	Q	Q	S	S
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194	195	196	197	198	199	200
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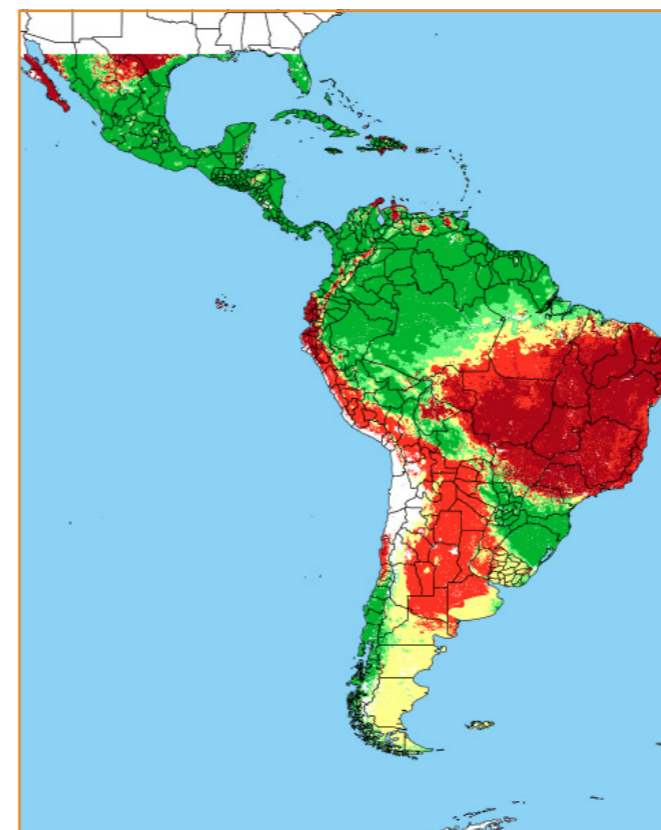
CALENDÁRIO JULIANO



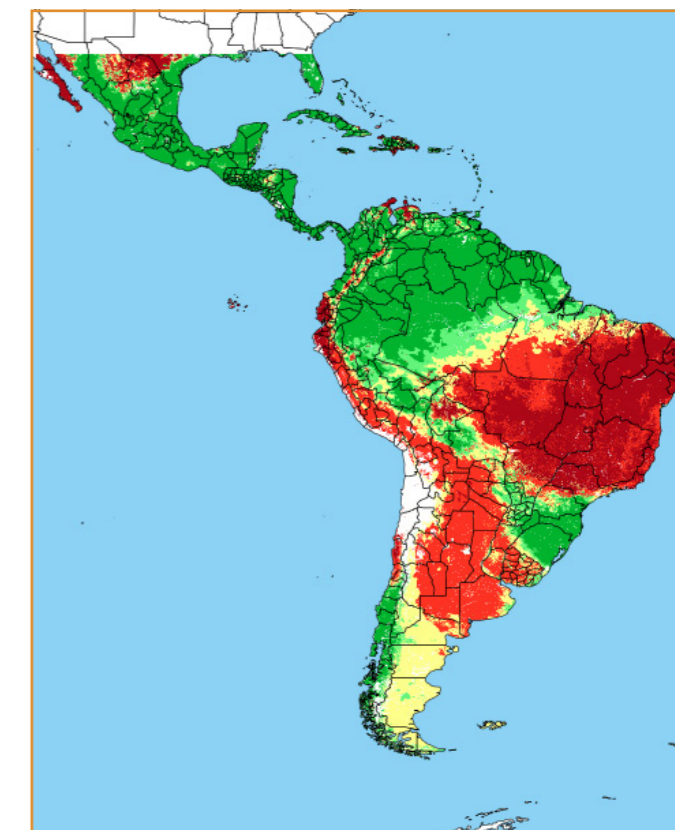
domingo, 26 de julho



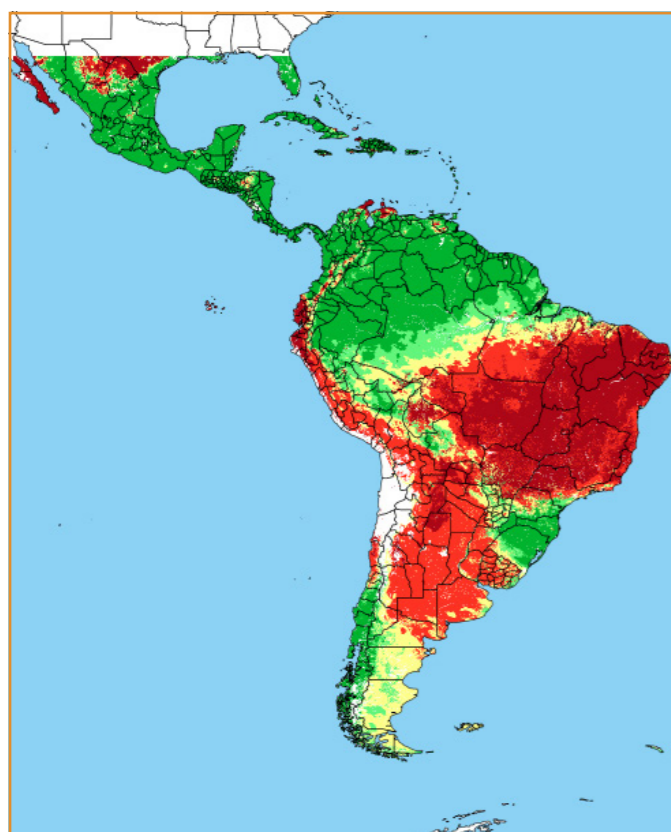
segunda-feira, 27 de julho



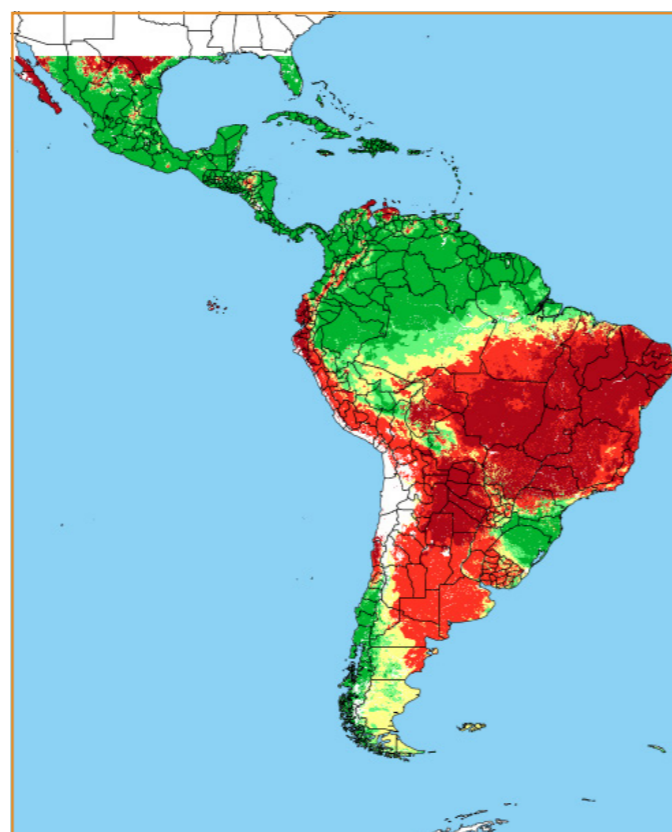
terça-feira, 28 de julho



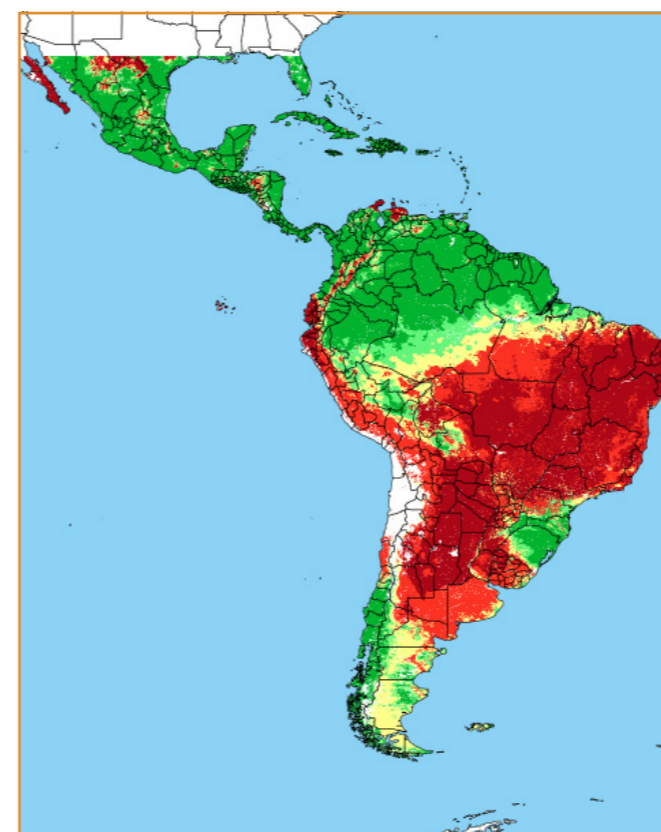
quarta-feira, 29 de julho



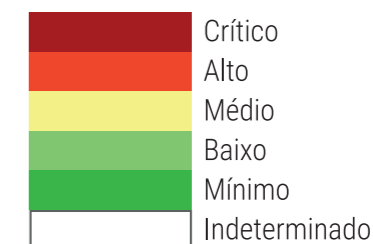
quinta-feira, 30 de julho



sexta-feira, 31 de julho



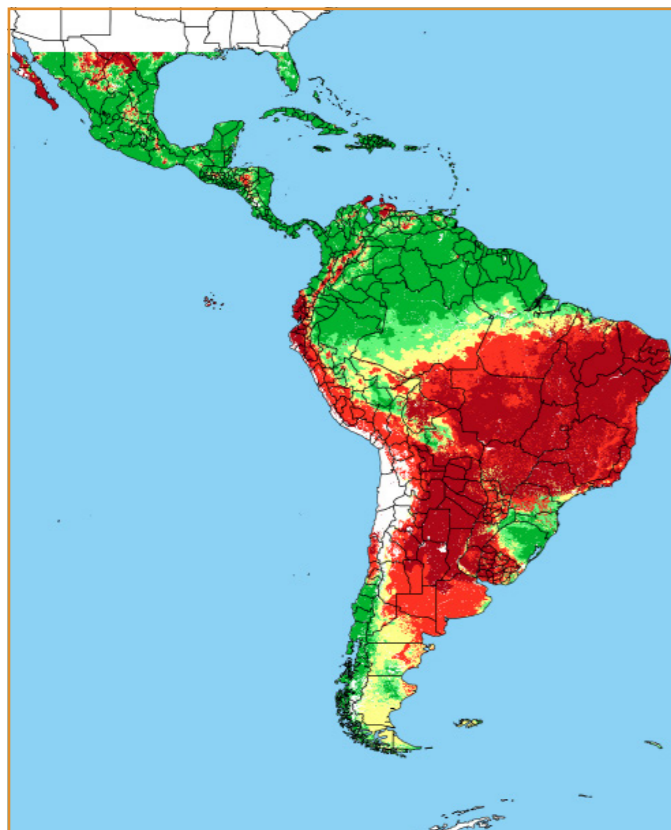
sábado, 1 de agosto



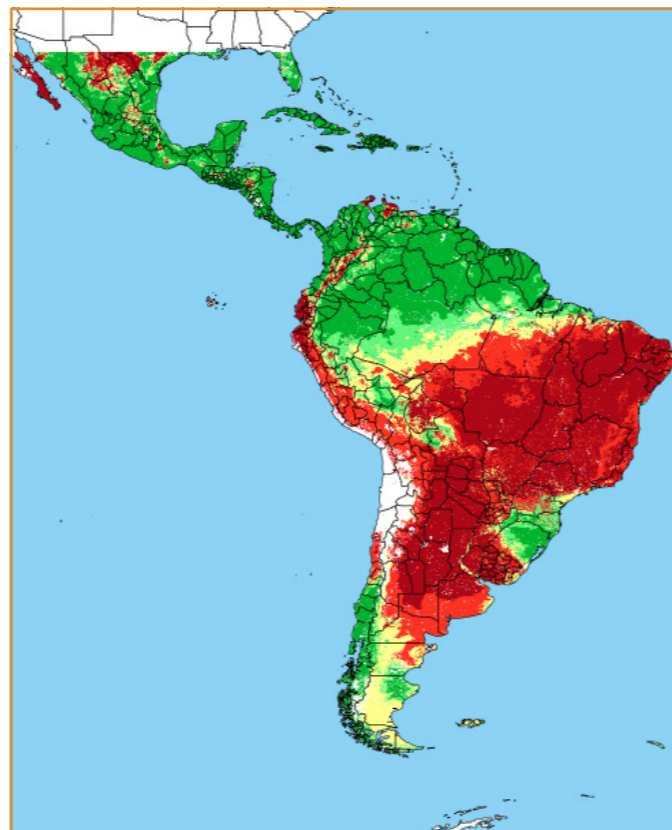
JULHO / 2020

D	S	T	Q	Q	S	S
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201	202	203	204	205	206	207
208	209	210	211	212	213	214

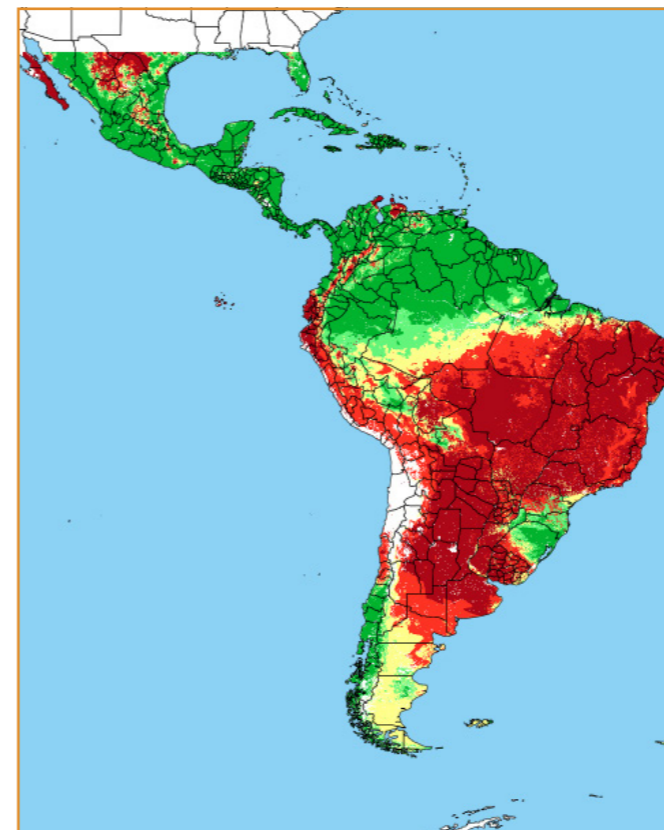
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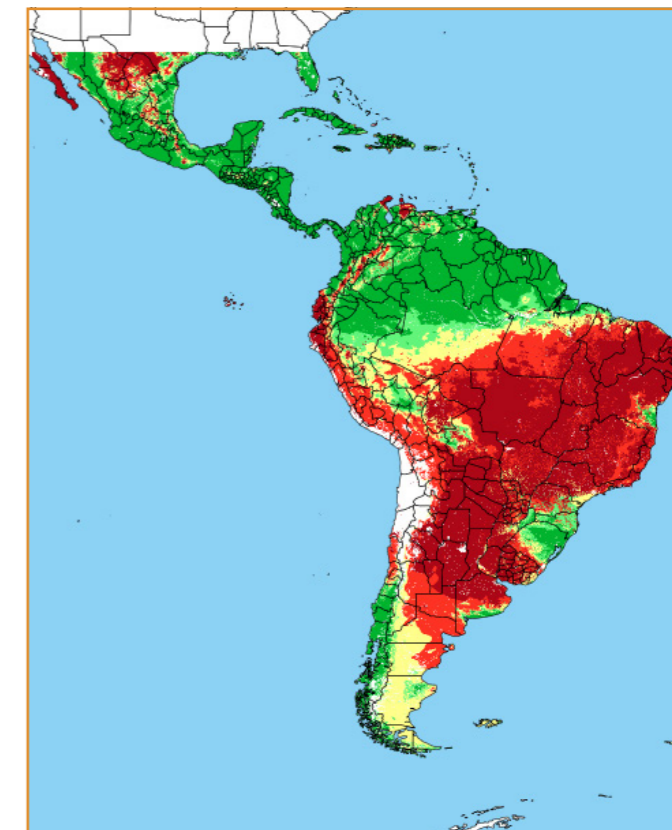
domingo, 2 de agosto



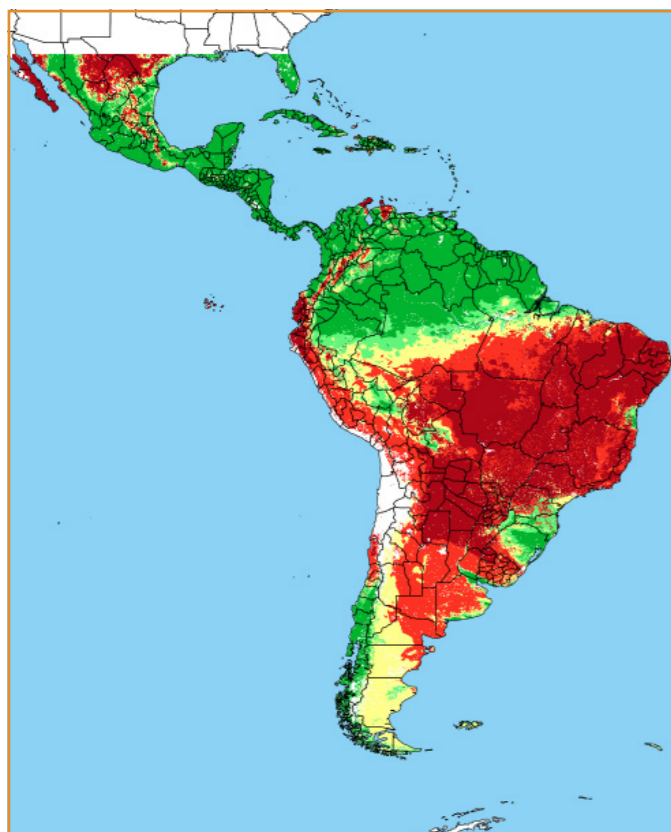
segunda-feira, 3 de agosto



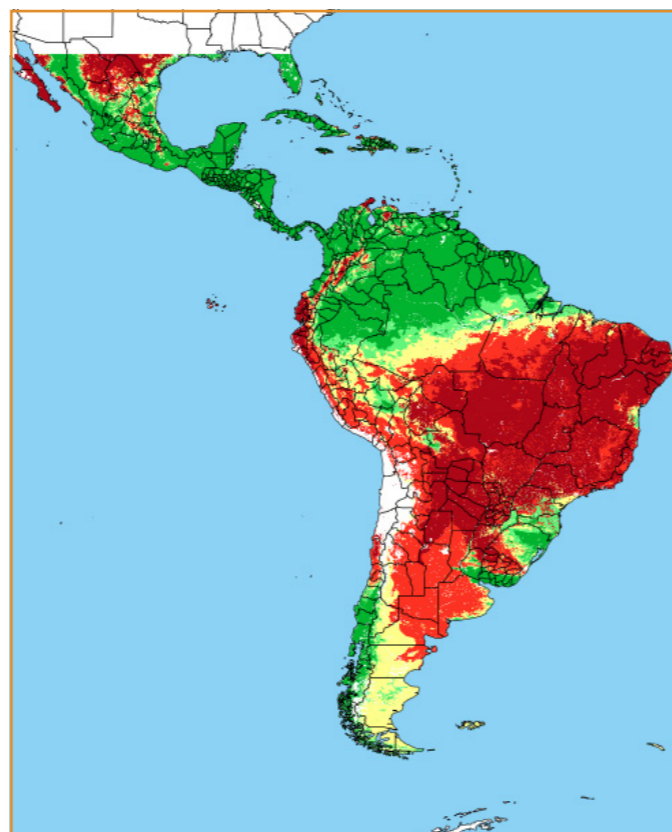
terça-feira, 4 de agosto



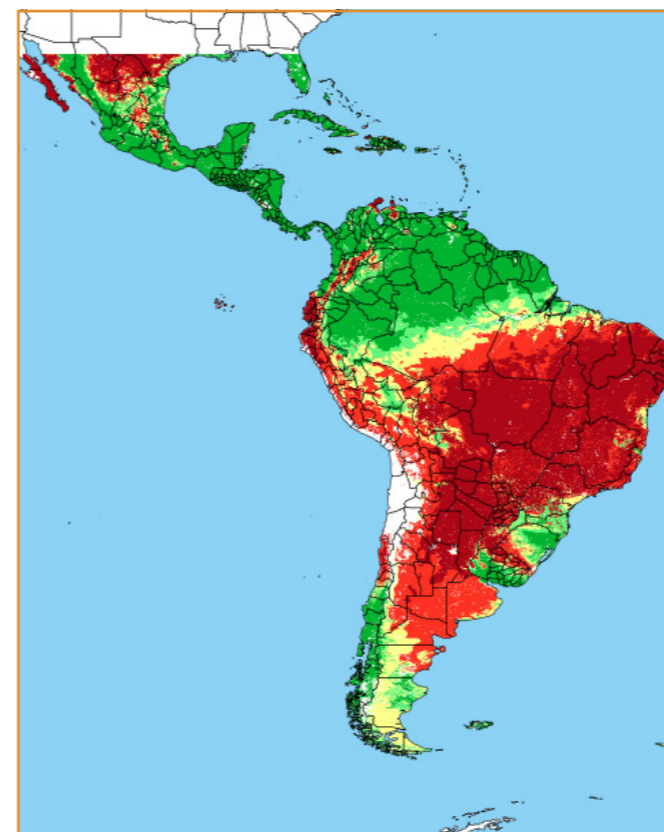
quarta-feira, 5 de agosto



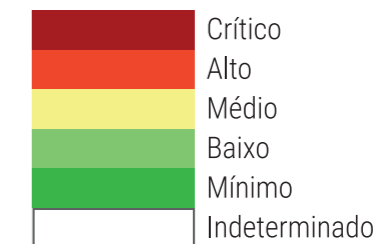
quinta-feira, 6 de agosto



sexta-feira, 7 de agosto

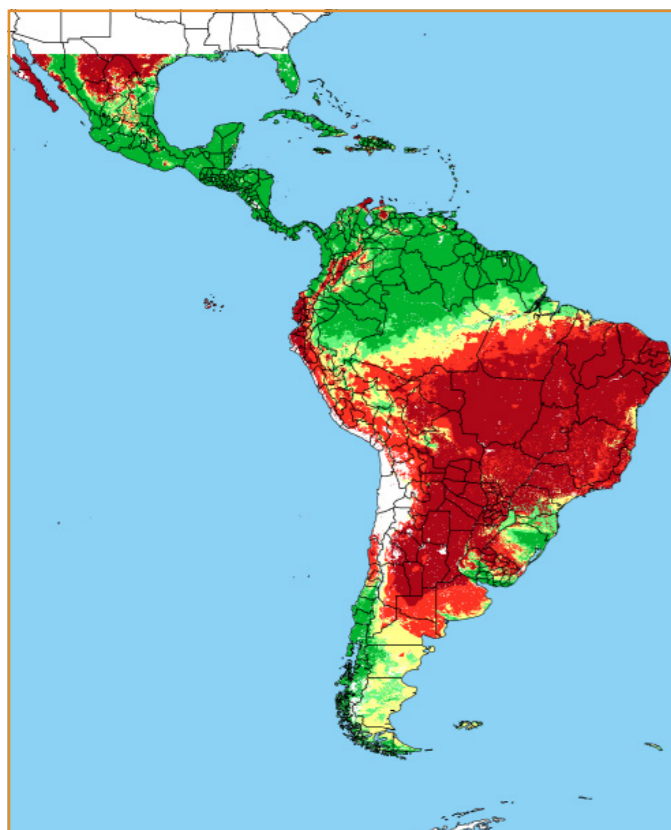


sábado, 8 de agosto

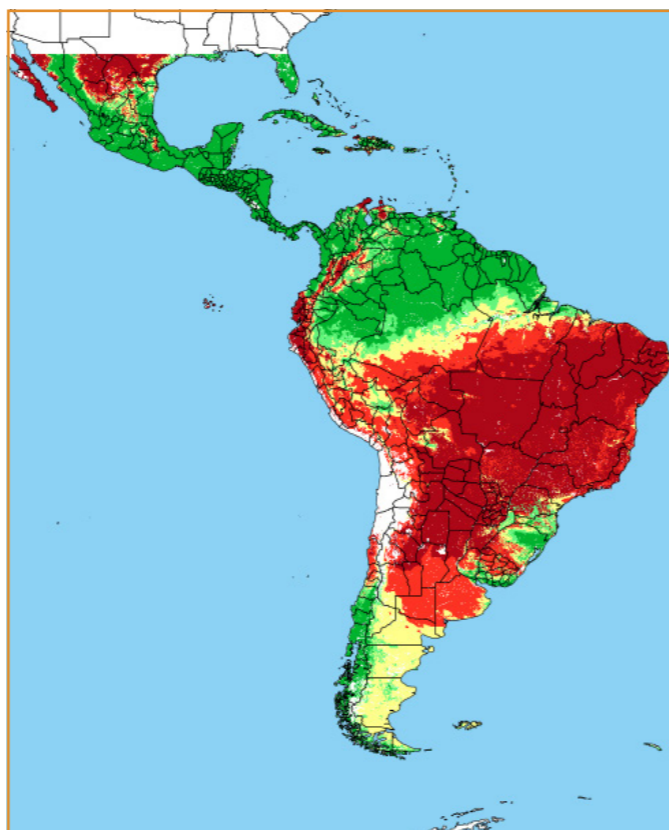


AGOSTO / 2020						
D	S	T	Q	Q	S	S
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215	216	217	218	219	220	221
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229	230	231	232	233	234	235
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243	244					

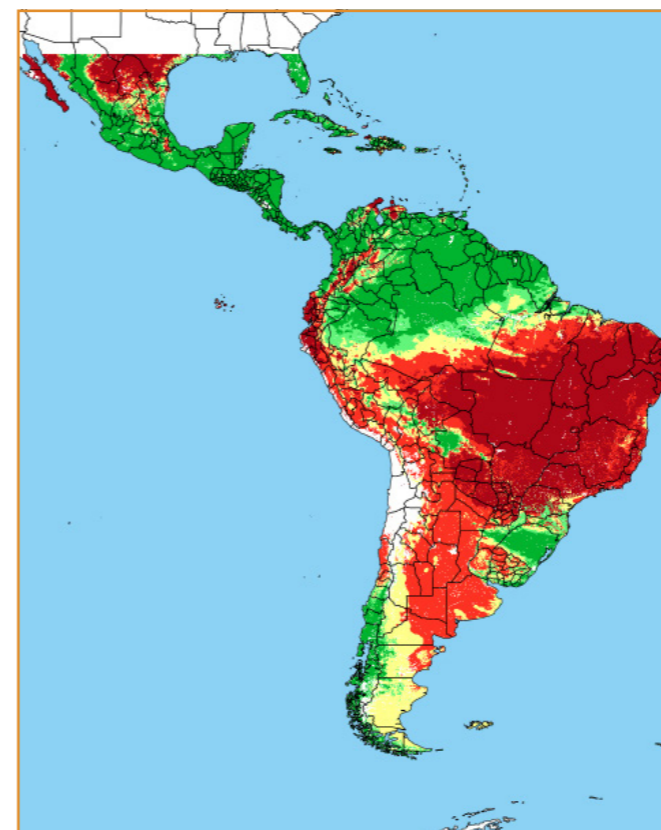
CALENDÁRIO JULIANO



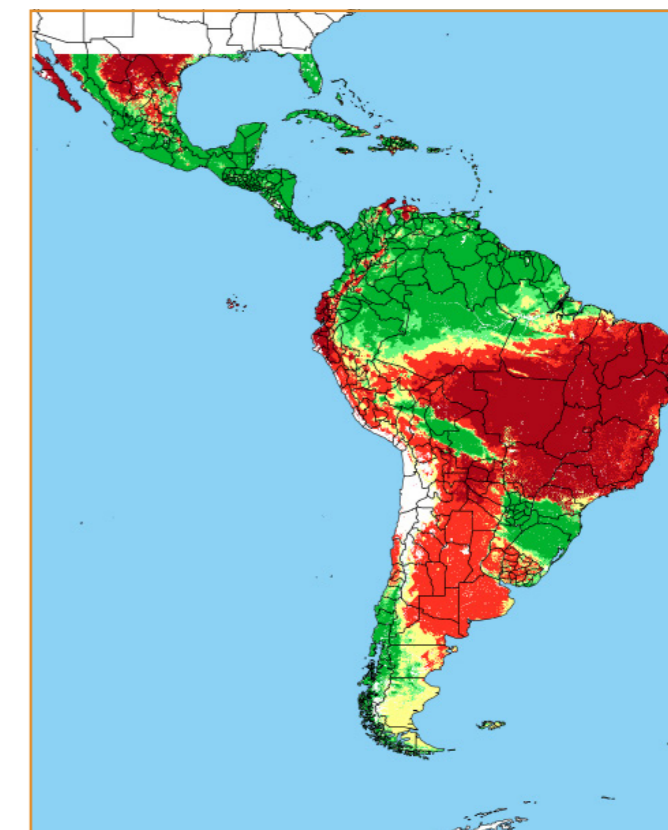
domingo, 9 de agosto



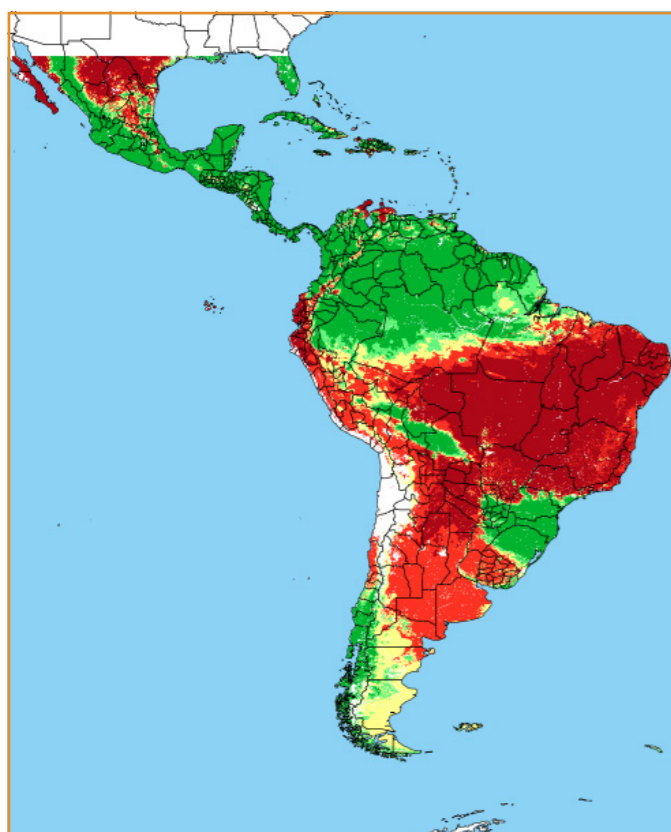
segunda-feira, 10 de agosto



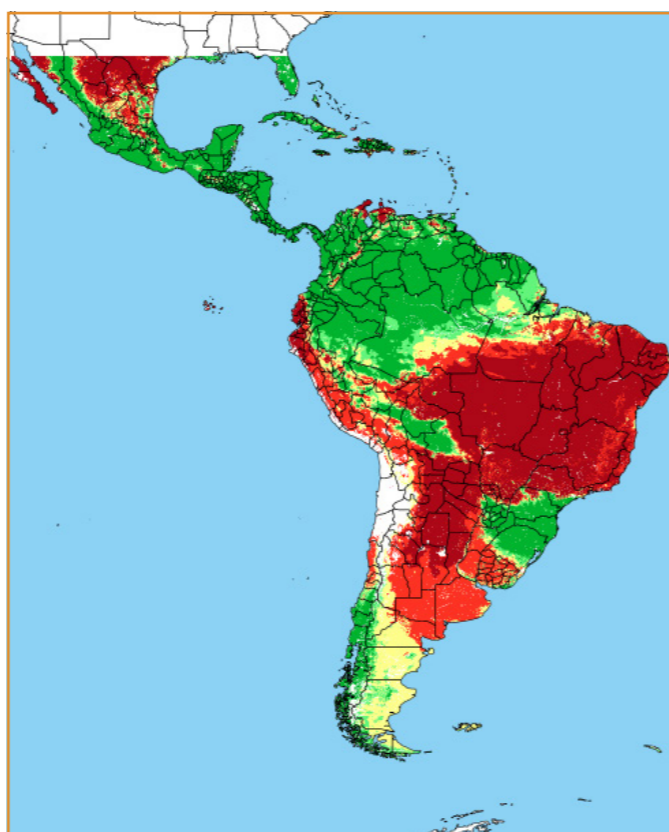
terça-feira, 11 de agosto



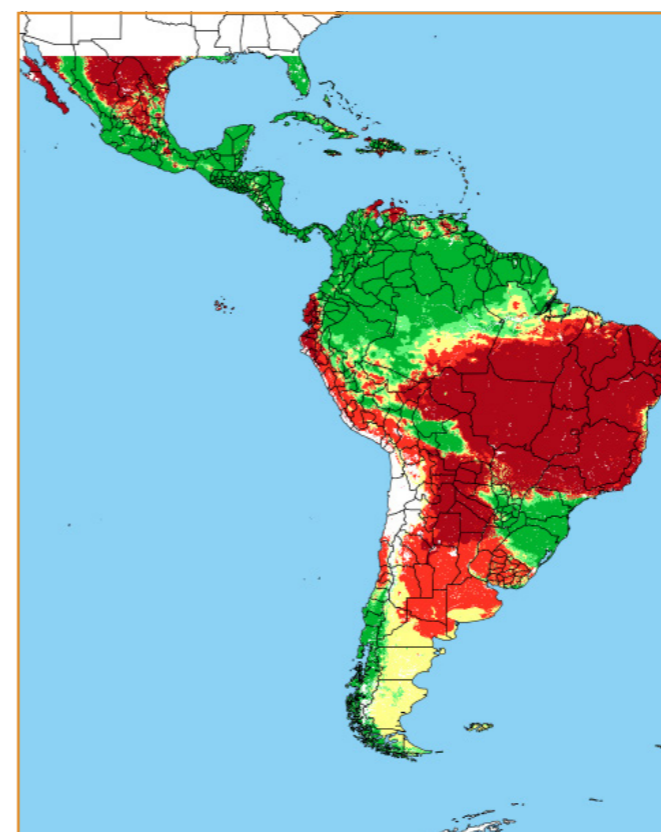
quarta-feira, 12 de agosto



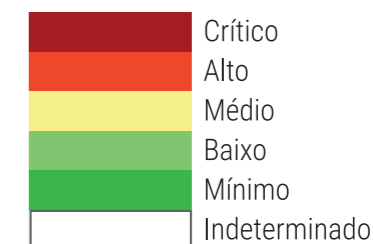
quinta-feira, 13 de agosto



sexta-feira, 14 de agosto

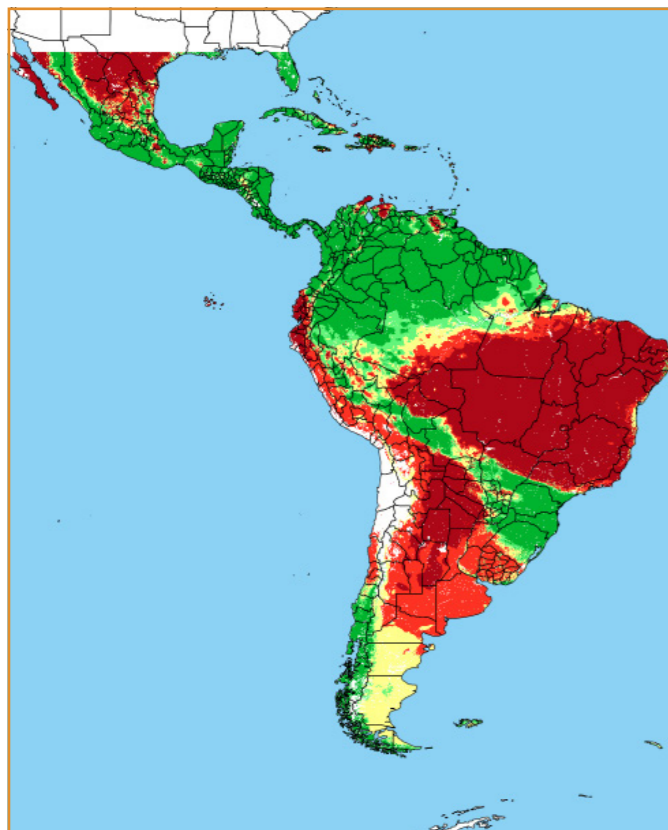


sábado, 15 de agosto

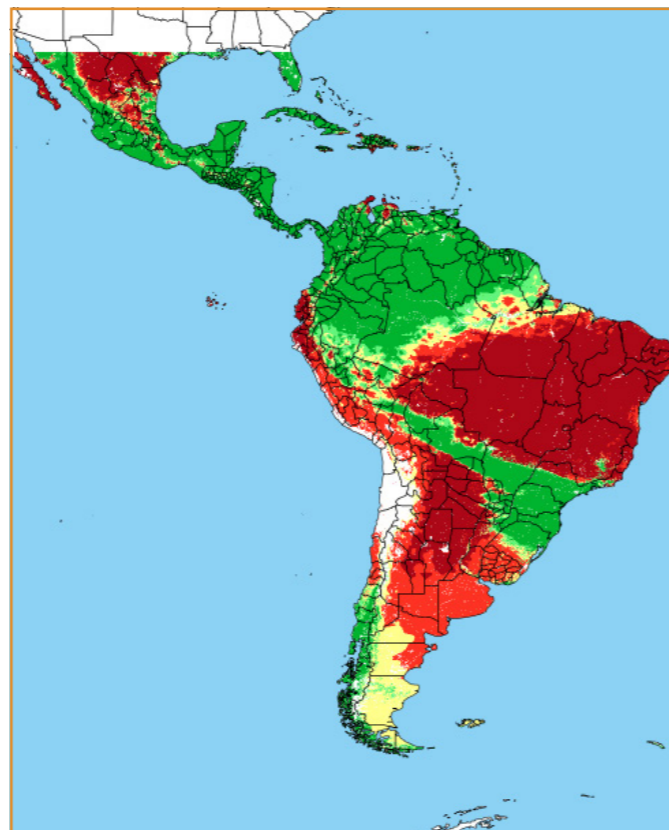


AGOSTO / 2020						
D	S	T	Q	Q	S	S
						214
215	216	217	218	219	220	221
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229	230	231	232	233	234	235
236	237	238	239	240	241	242
243	244					

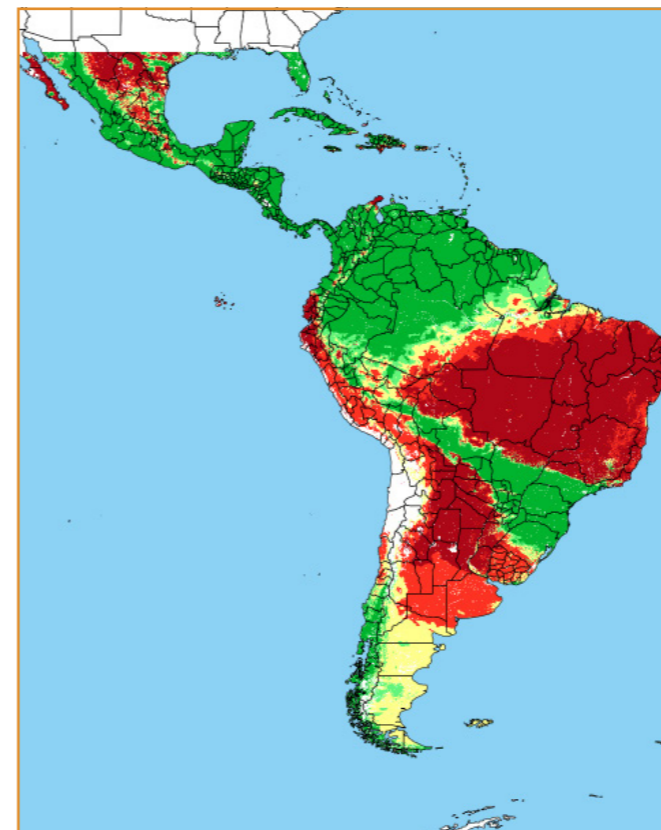
CALENDÁRIO JULIANO



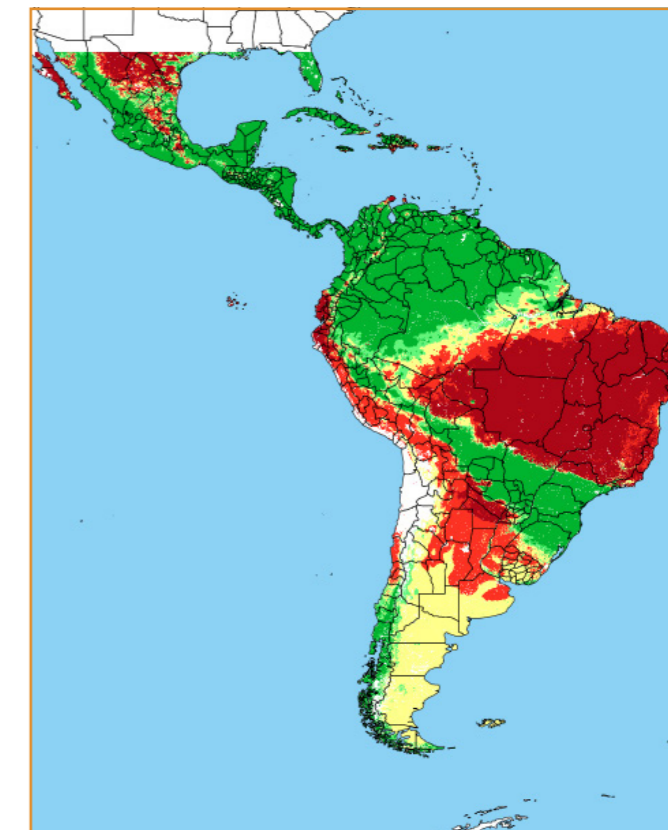
domingo, 16 de agosto



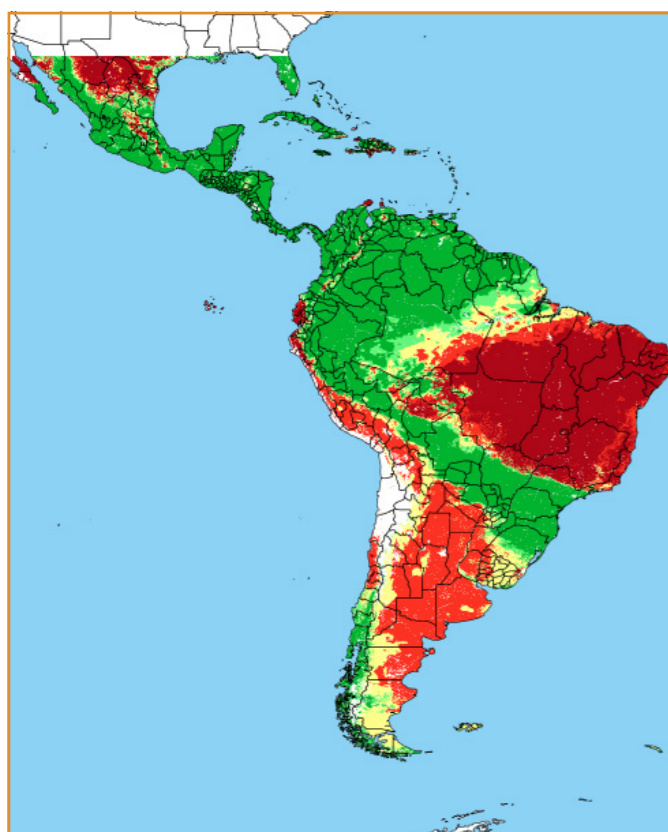
segunda-feira, 17 de agosto



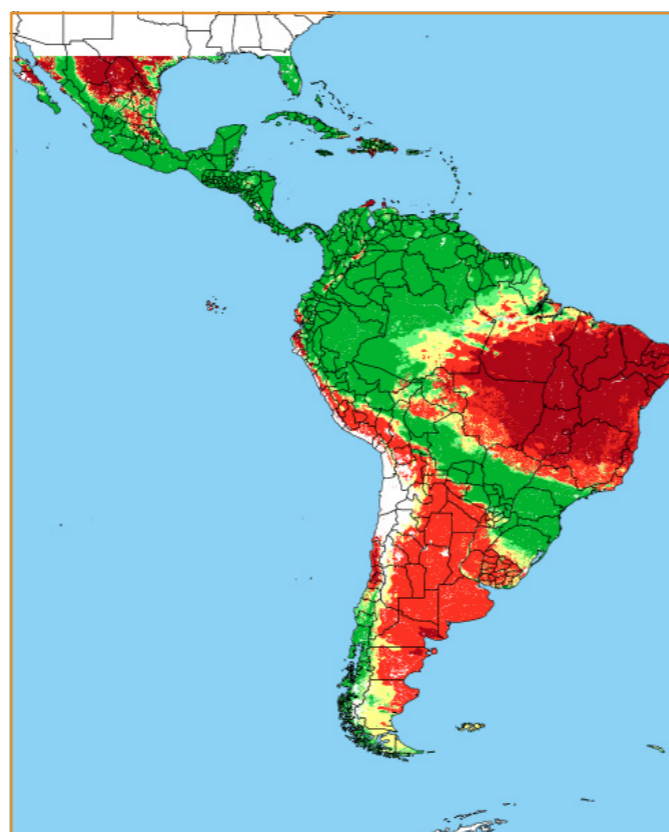
terça-feira, 18 de agosto



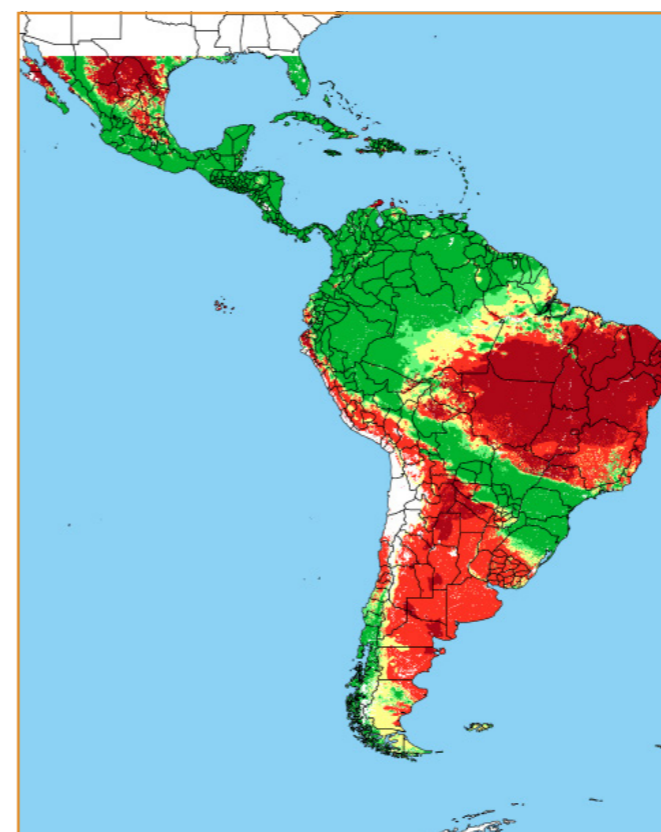
quarta-feira, 19 de agosto



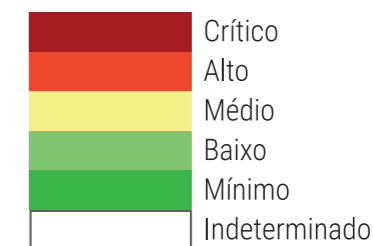
quinta-feira, 20 de agosto



sexta-feira, 21 de agosto



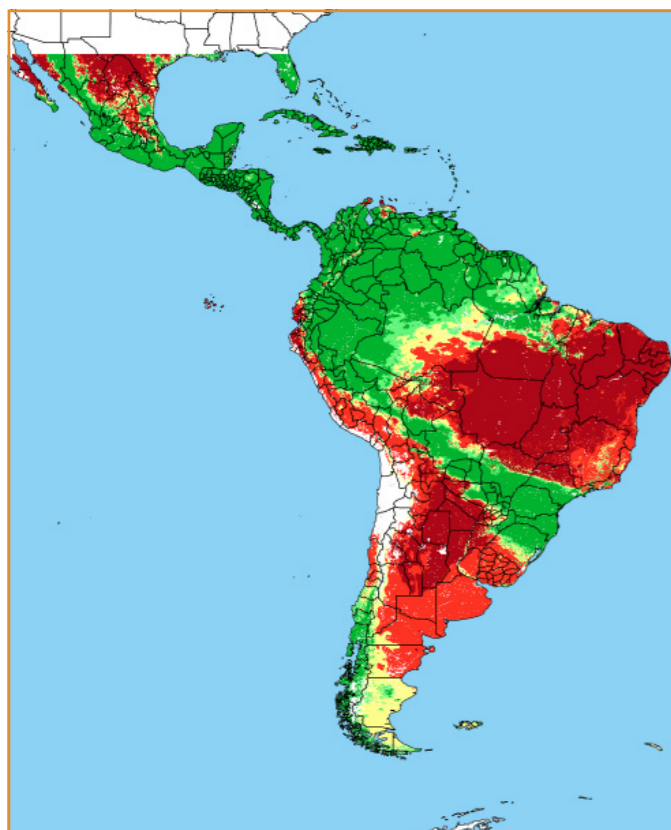
sábado, 22 de agosto



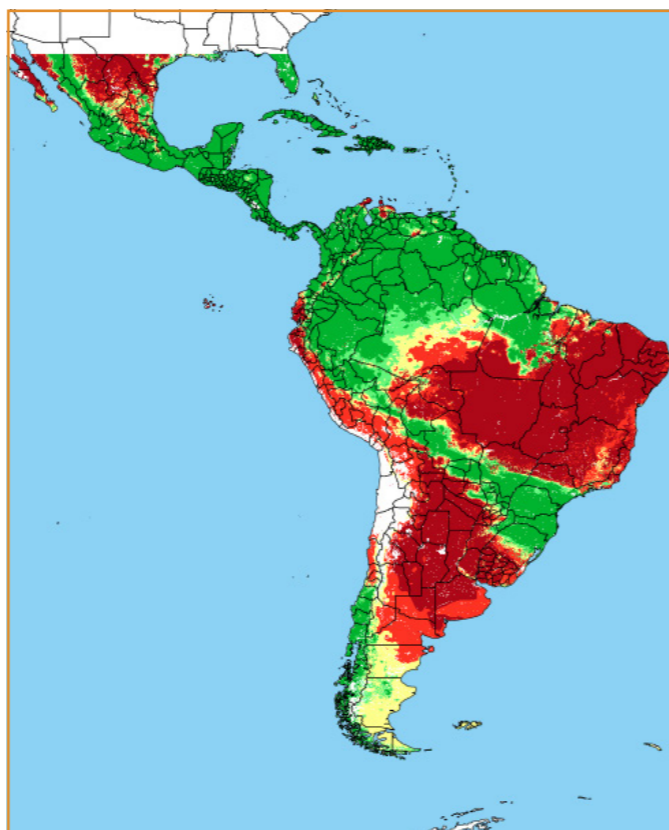
AGOSTO / 2020						
D	S	T	Q	Q	S	S
						214
215	216	217	218	219	220	221
222	223	224	225	226	227	228
229	230	231	232	233	234	235
236	237	238	239	240	241	242
243	244					

CALENDÁRIO JULIANO

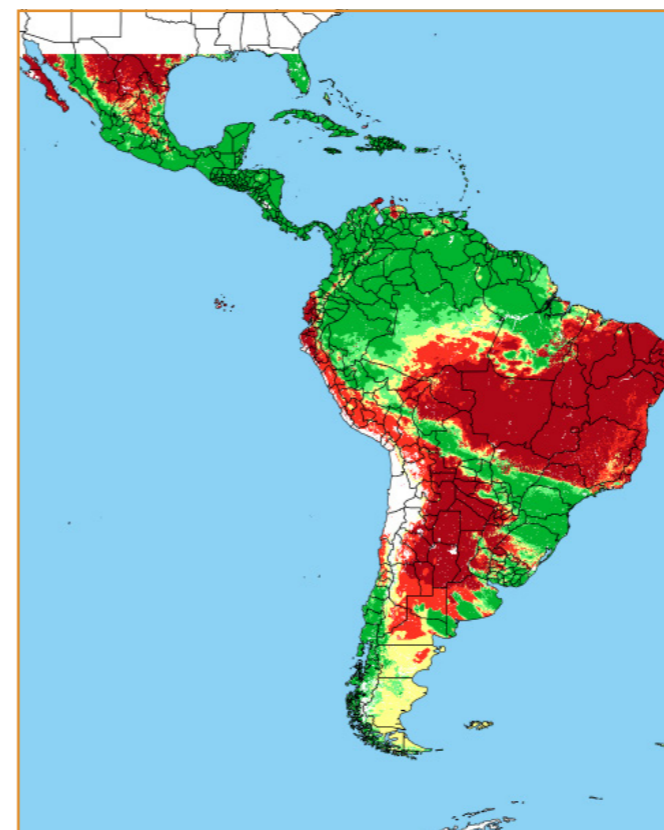




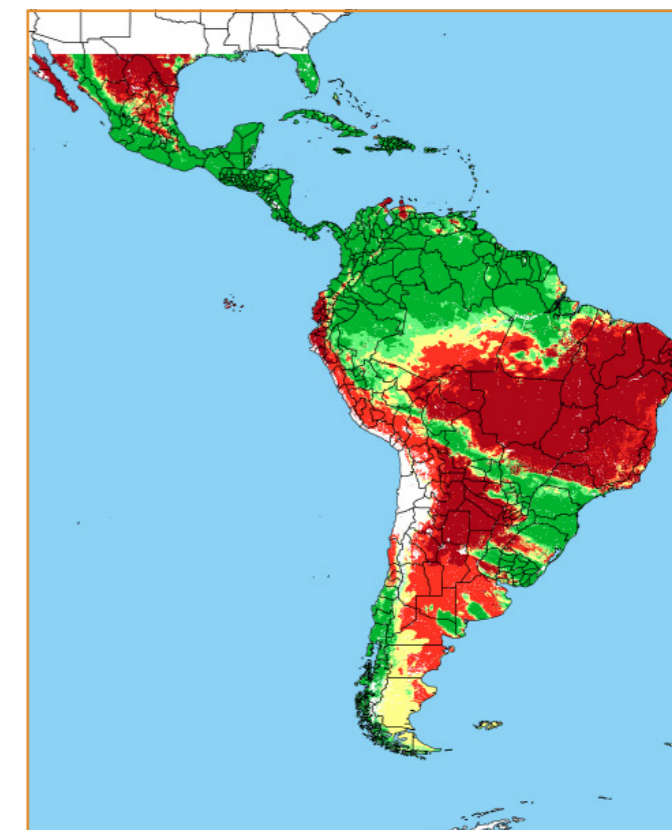
domingo, 23 de agosto



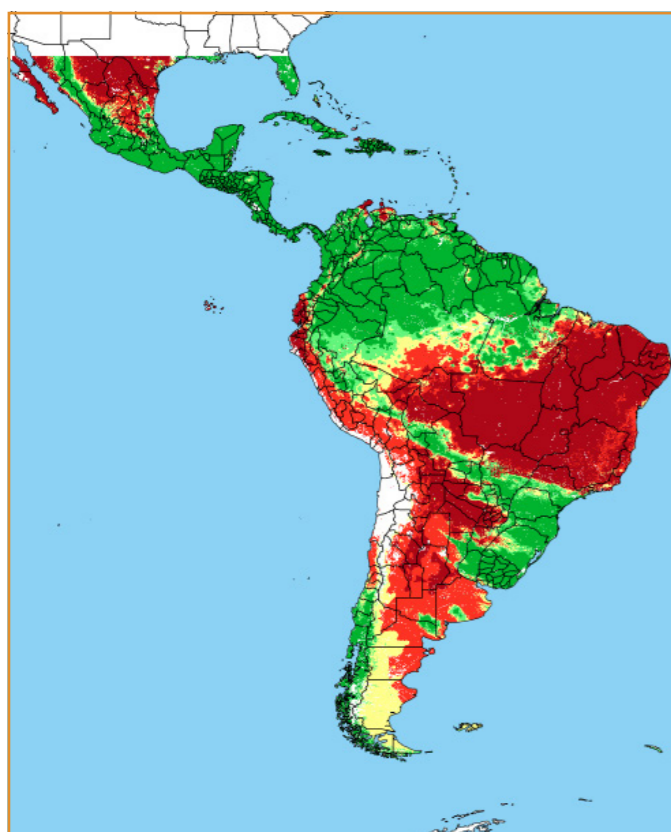
segunda-feira, 24 de agosto



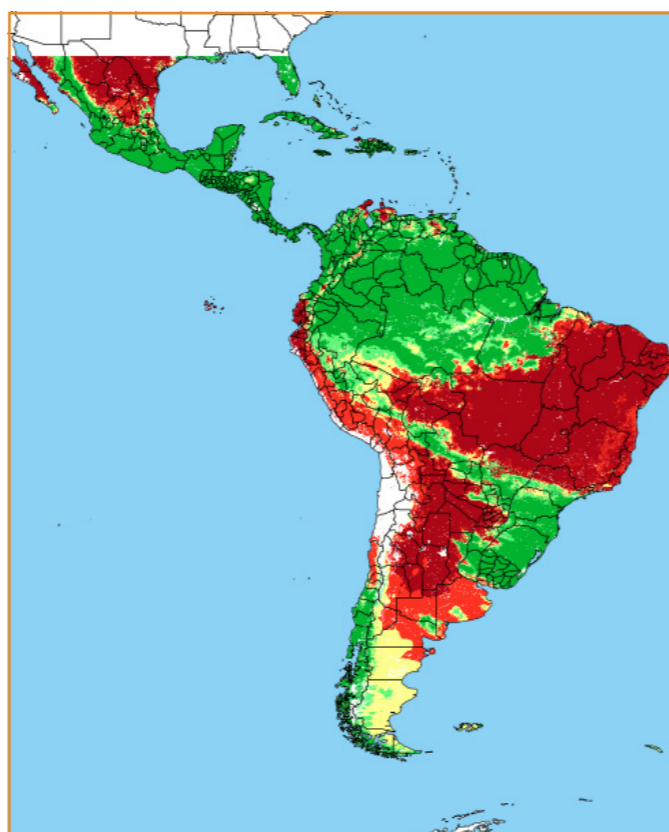
terça-feira, 25 de agosto



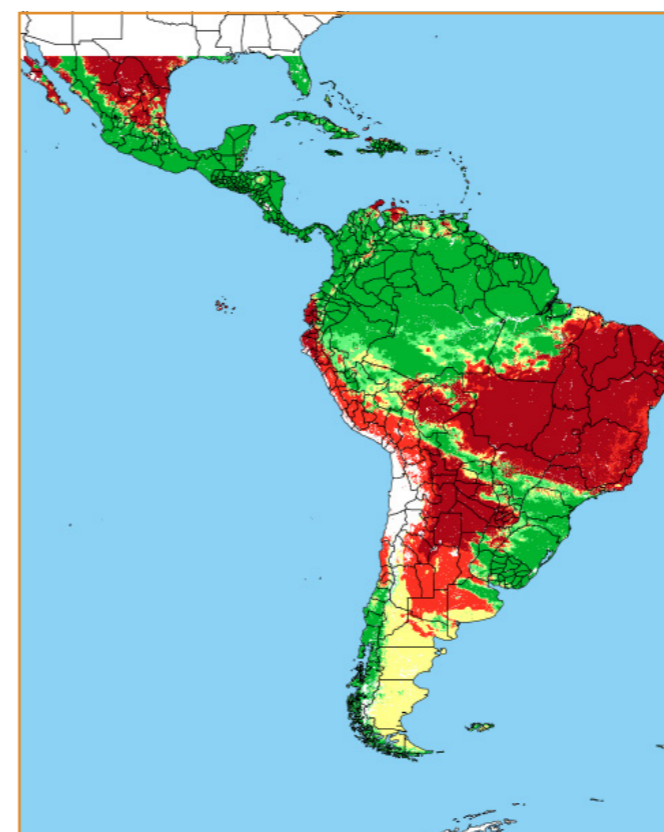
quarta-feira, 26 de agosto



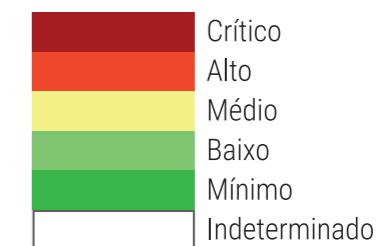
quinta-feira, 27 de agosto



sexta-feira, 28 de agosto

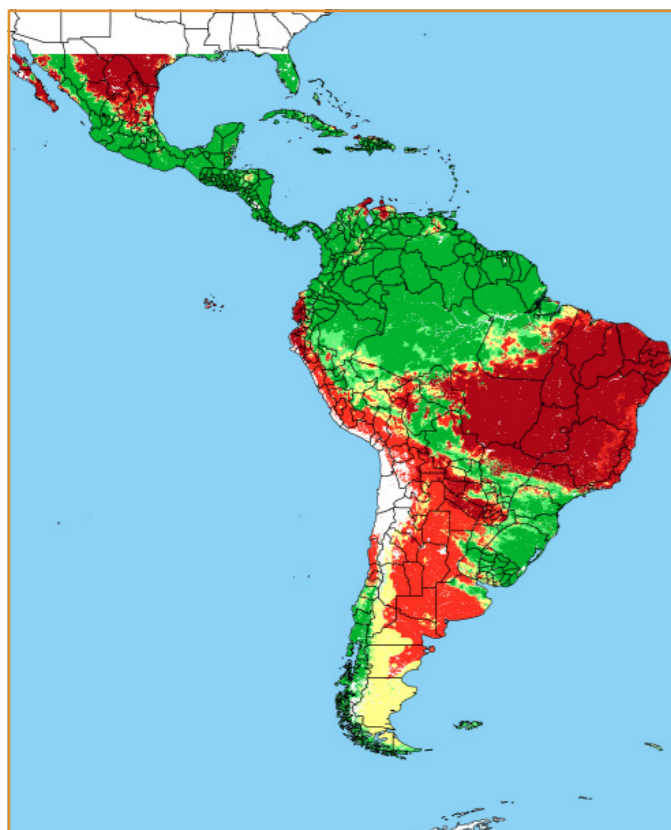


sábado, 29 de agosto

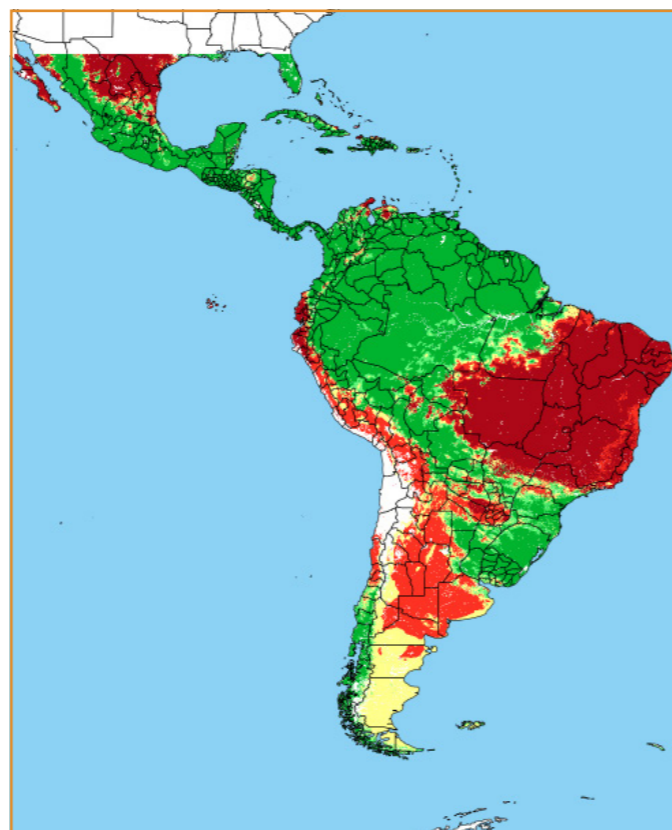


AGOSTO / 2020						
D	S	T	Q	Q	S	S
						214
215	216	217	218	219	220	221
222	223	224	225	226	227	228
229	230	231	232	233	234	235
236	237	238	239	240	241	242
243	244					

CALENDÁRIO JULIANO



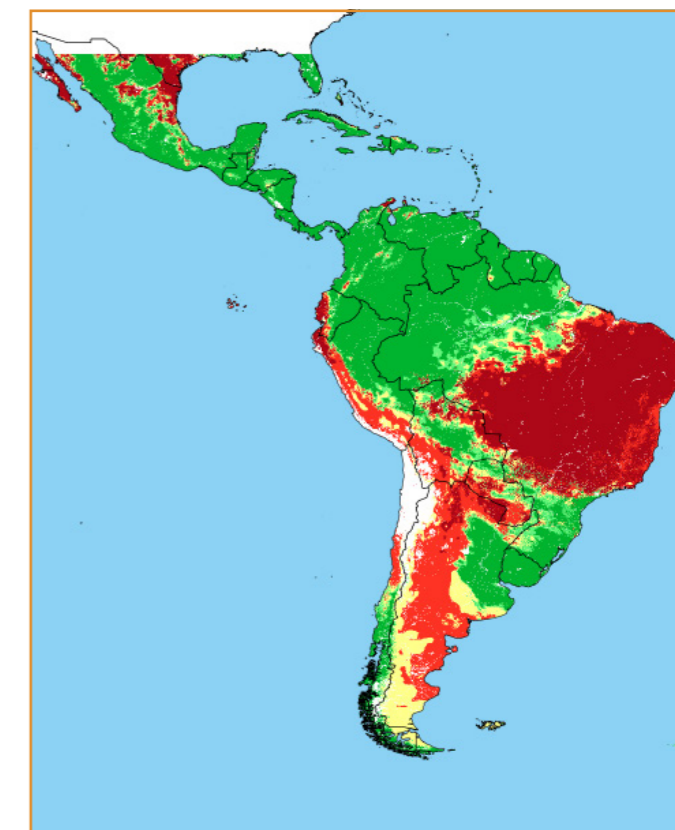
domingo, 30 de agosto



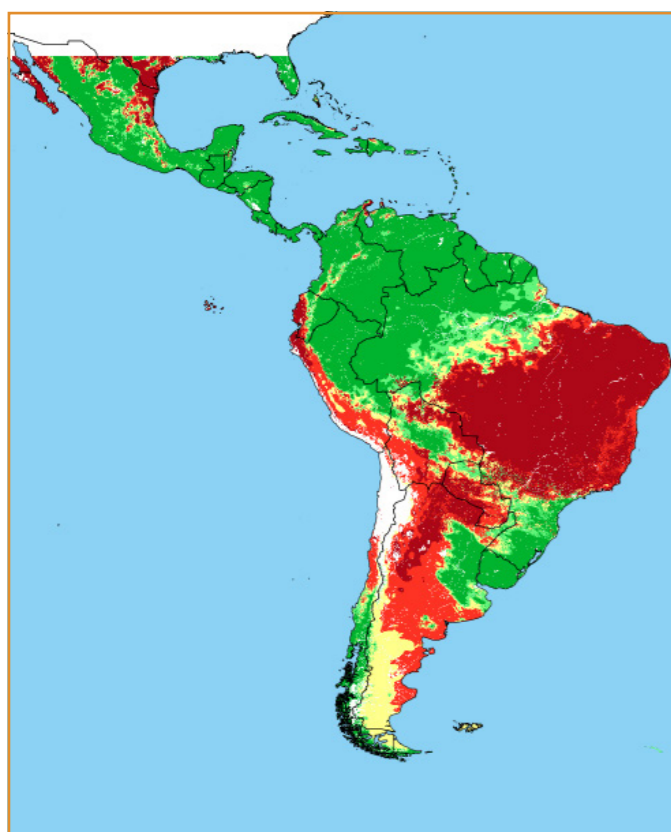
segunda-feira, 31 de agosto



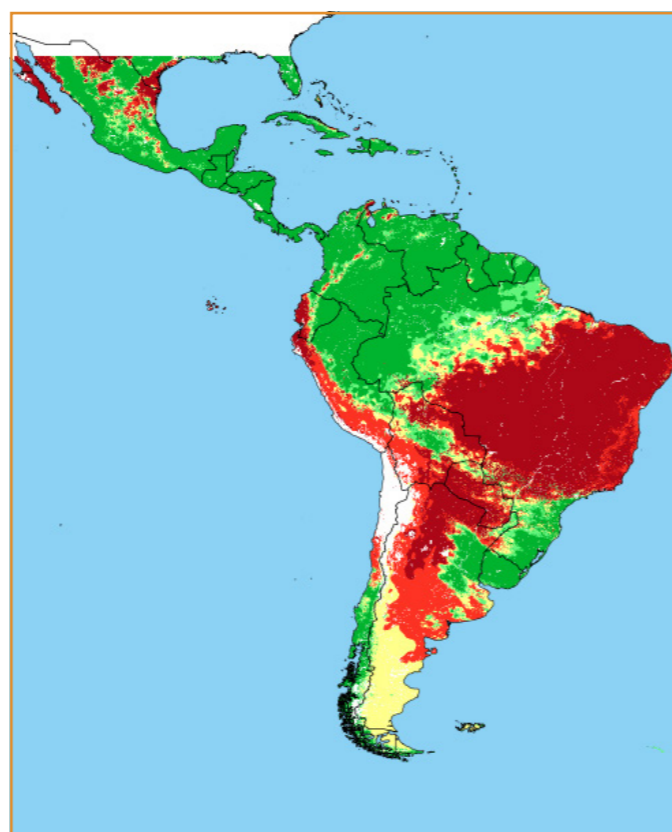
terça-feira, 1 de setembro



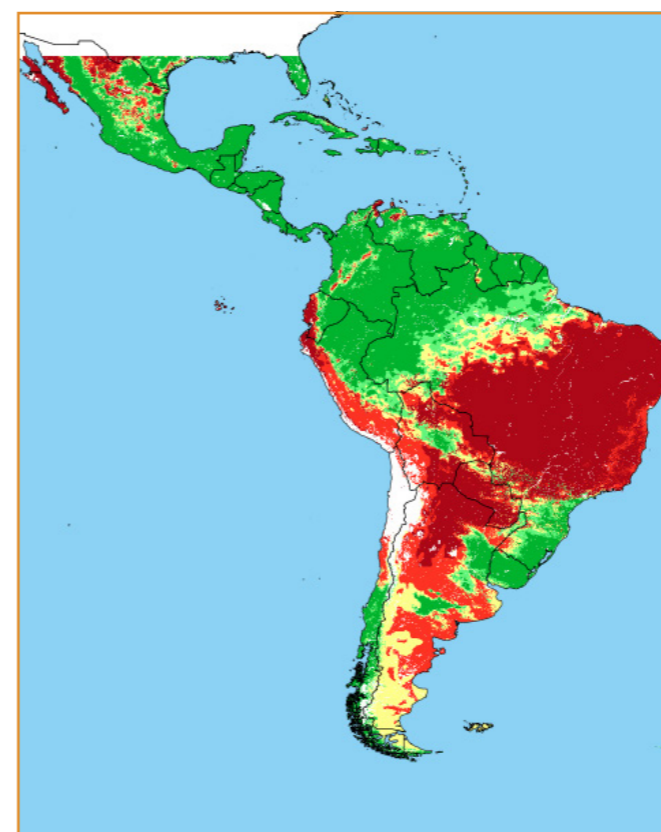
quarta-feira, 2 de setembro



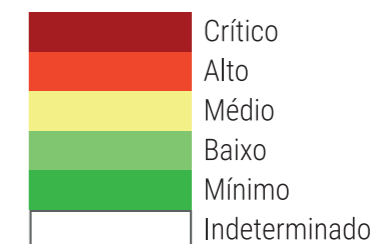
quinta-feira, 3 de setembro



sexta-feira, 4 de setembro

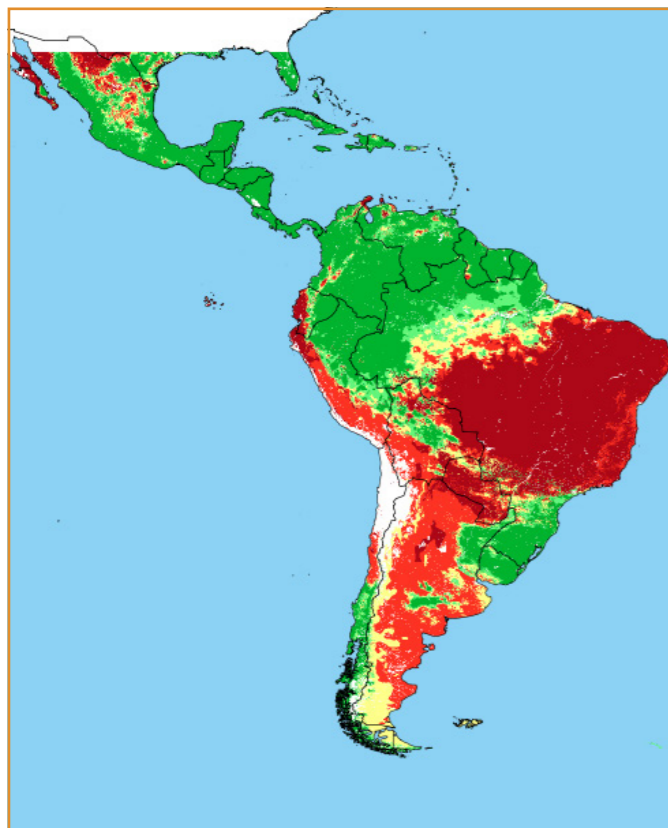


sábado, 5 de setembro

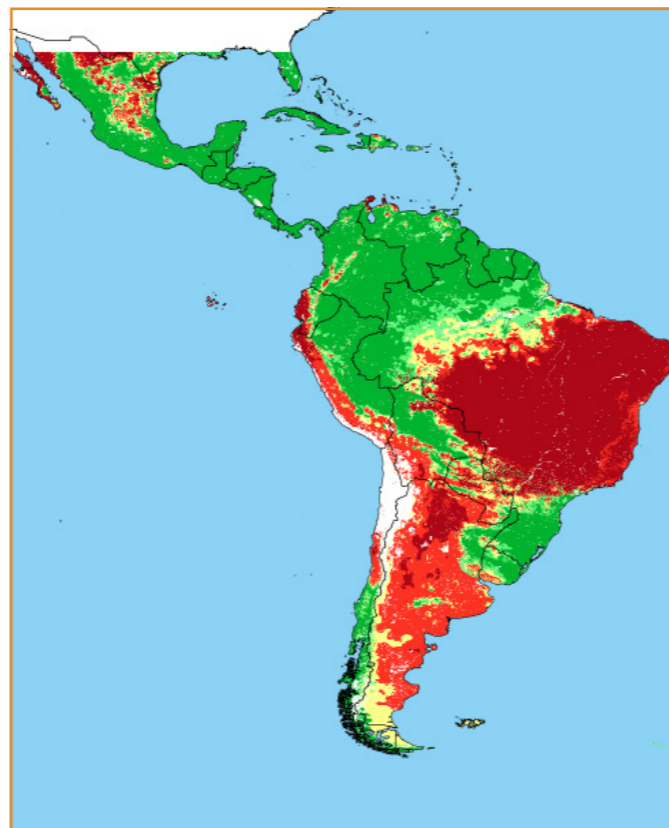


SETEMBRO / 2020							
D	S	T	Q	Q	S	S	
243	244	245	246	247	248	249	
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257	258	259	260	261	262	263	
264	265	266	267	268	269	270	
271	272	273	274				

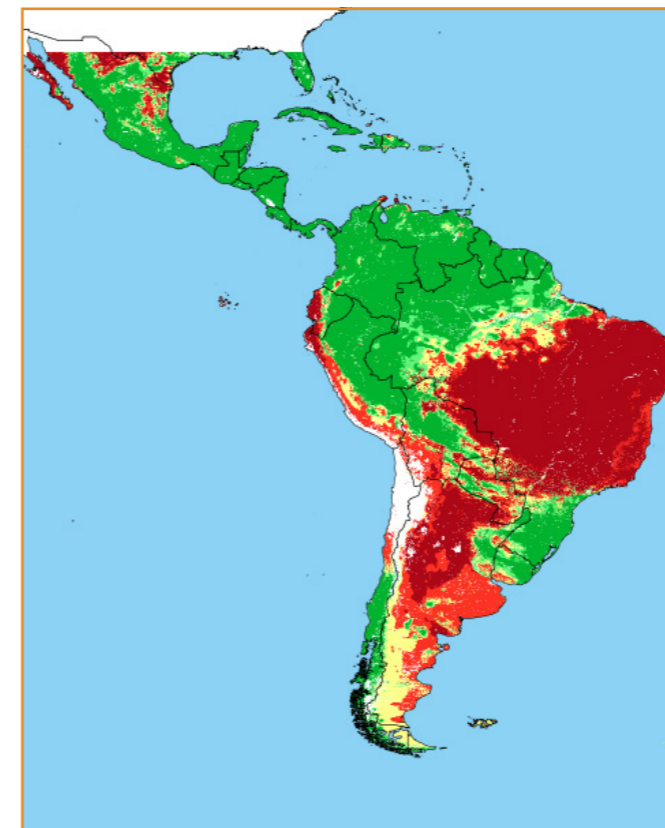
CALENDÁRIO JULIANO



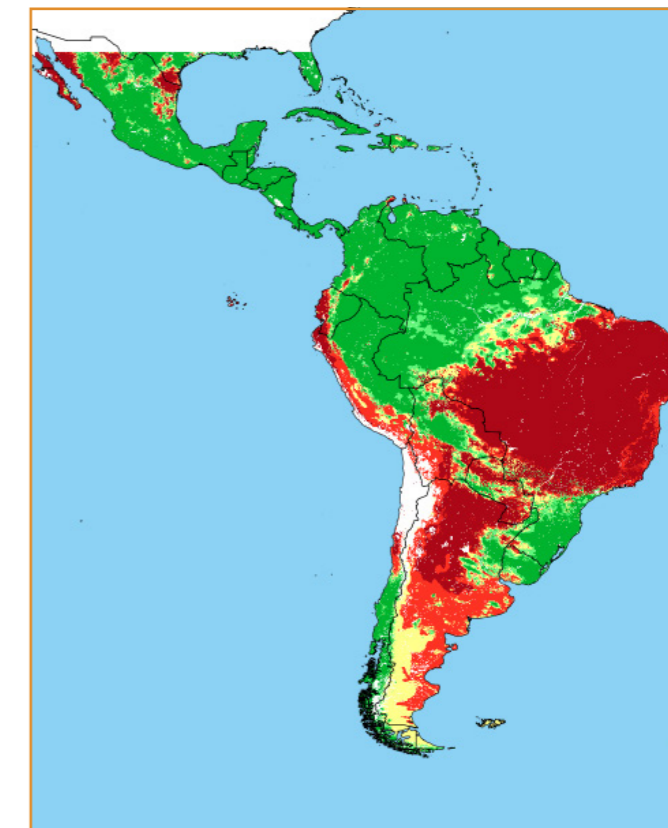
domingo, 6 de setembro



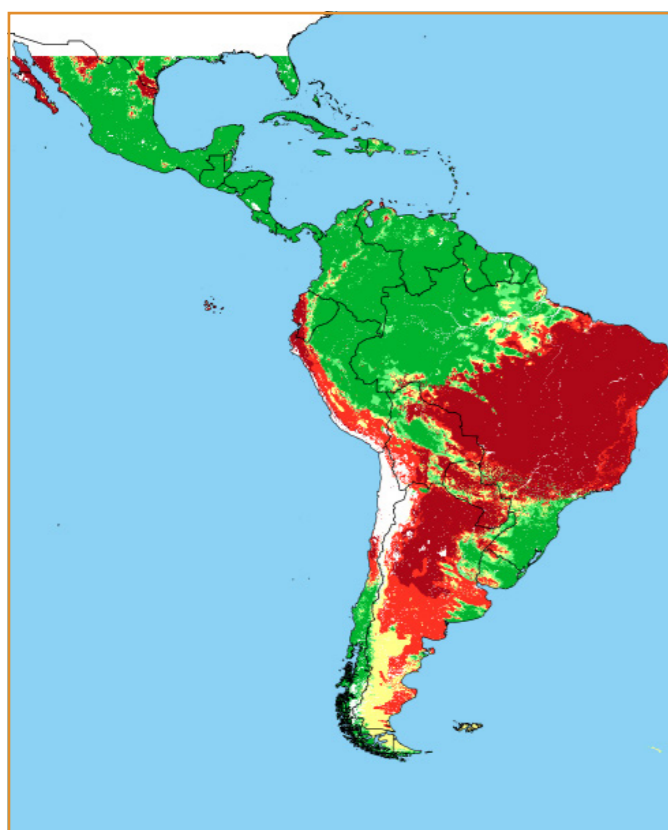
segunda-feira, 7 de setembro



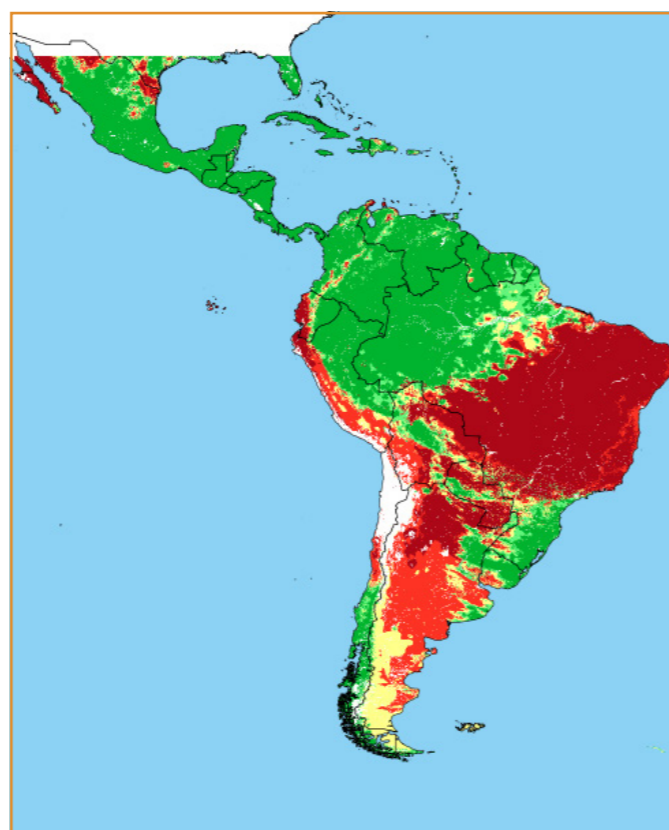
terça-feira, 8 de setembro



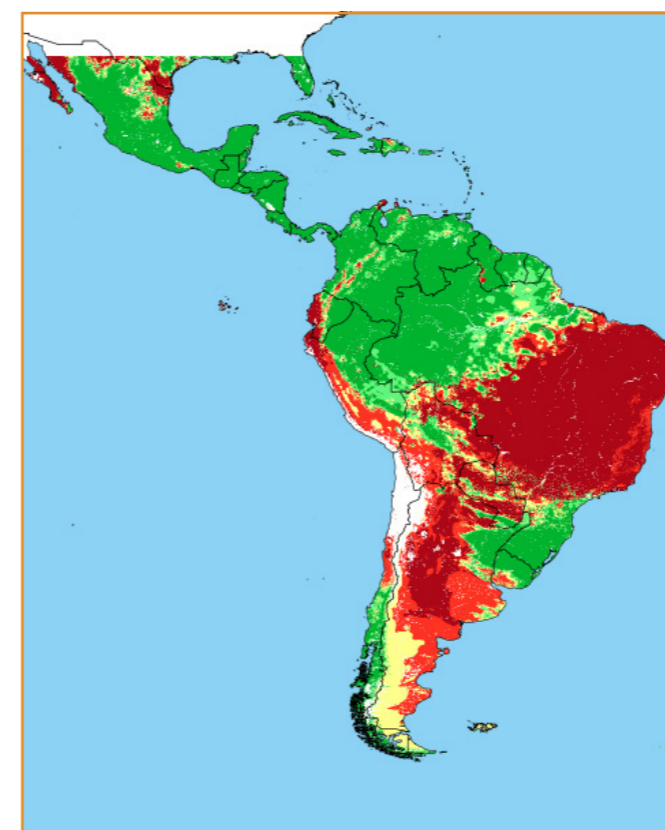
quarta-feira, 9 de setembro



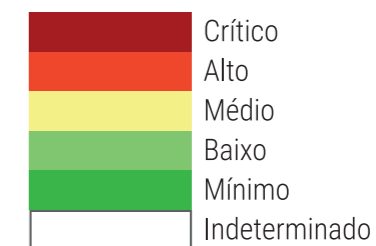
quinta-feira, 10 de setembro



sexta-feira, 11 de setembro



sábado, 12 de setembro



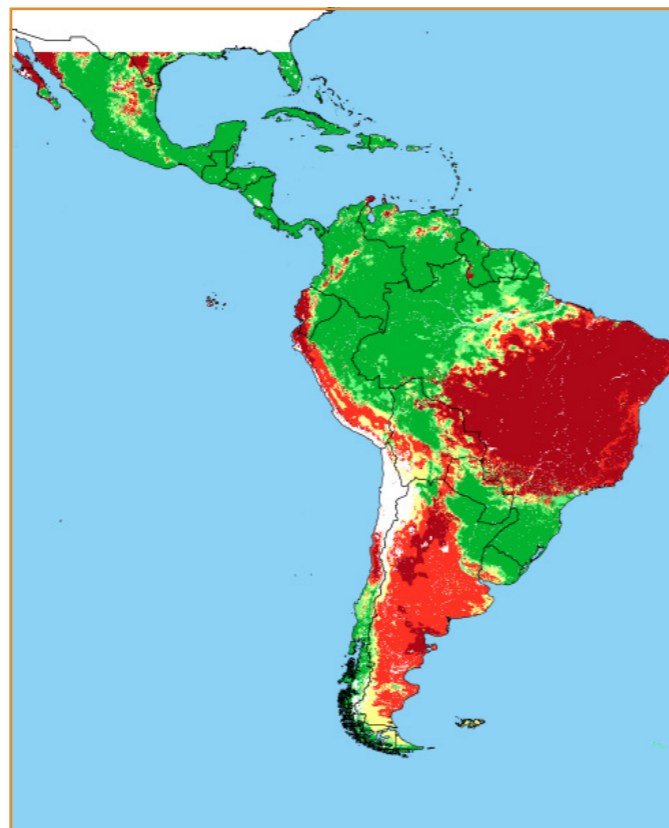
SETEMBRO / 2020

D	S	T	Q	Q	S	S
		245	246	247	248	249
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264	265	266	267	268	269	270
271	272	273	274			

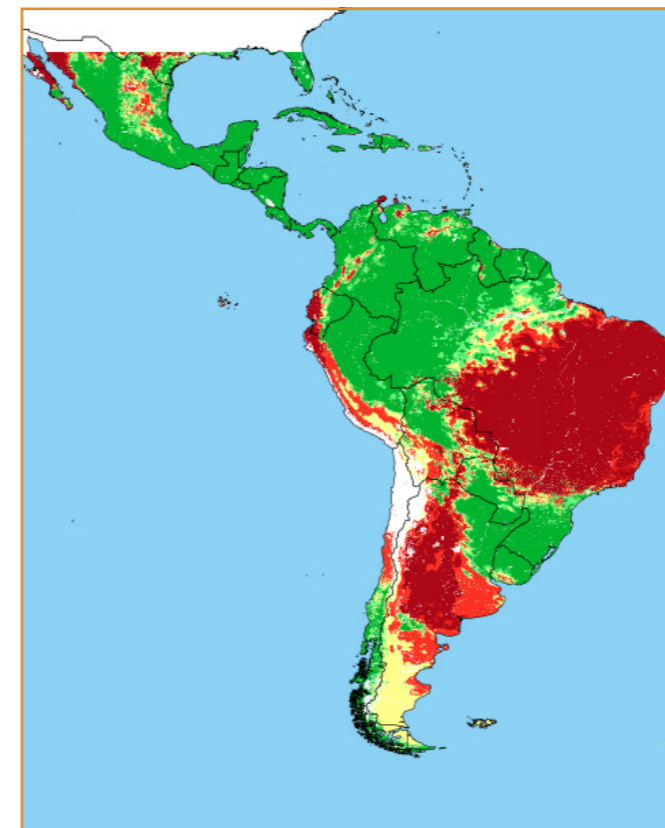
CALENDÁRIO JULIANO



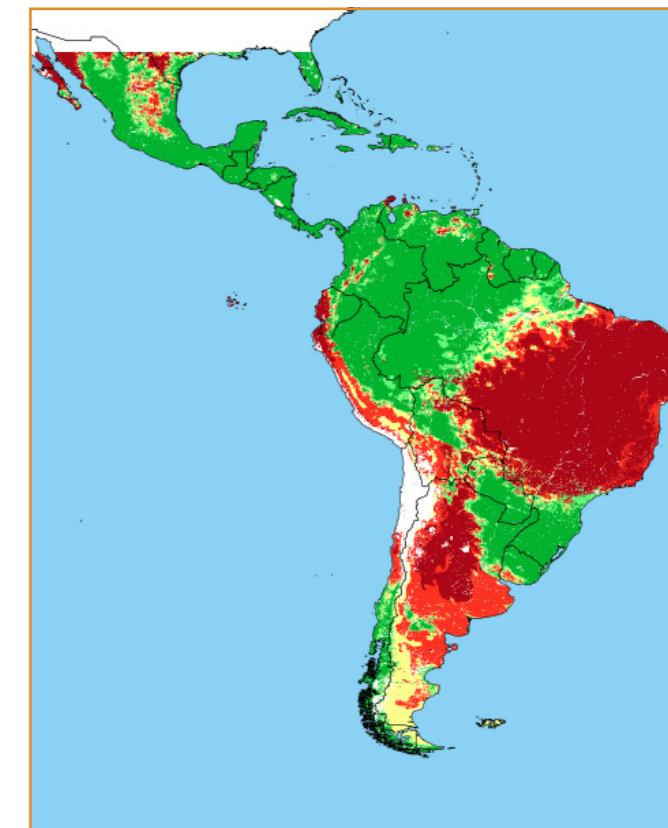
domingo, 13 de setembro



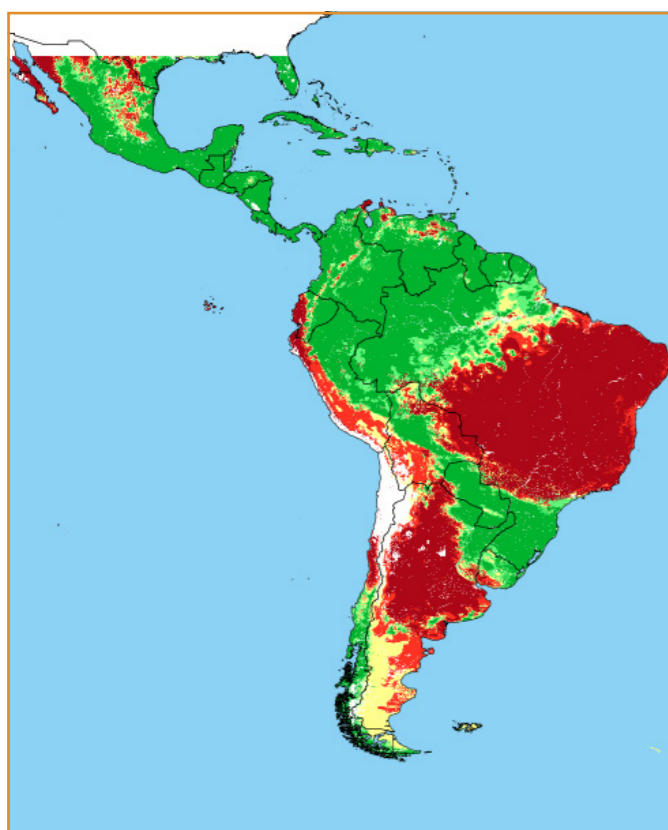
segunda-feira, 14 de setembro



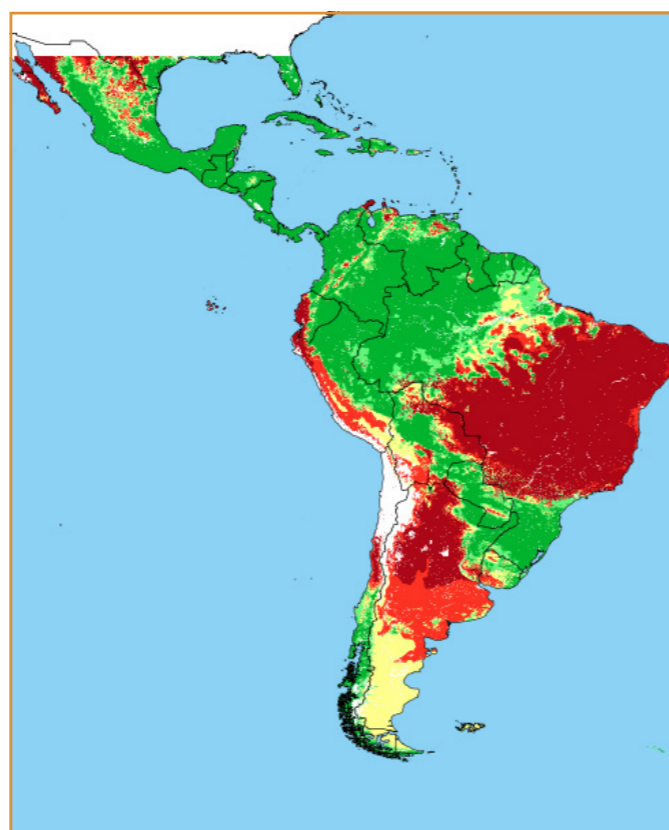
terça-feira, 15 de setembro



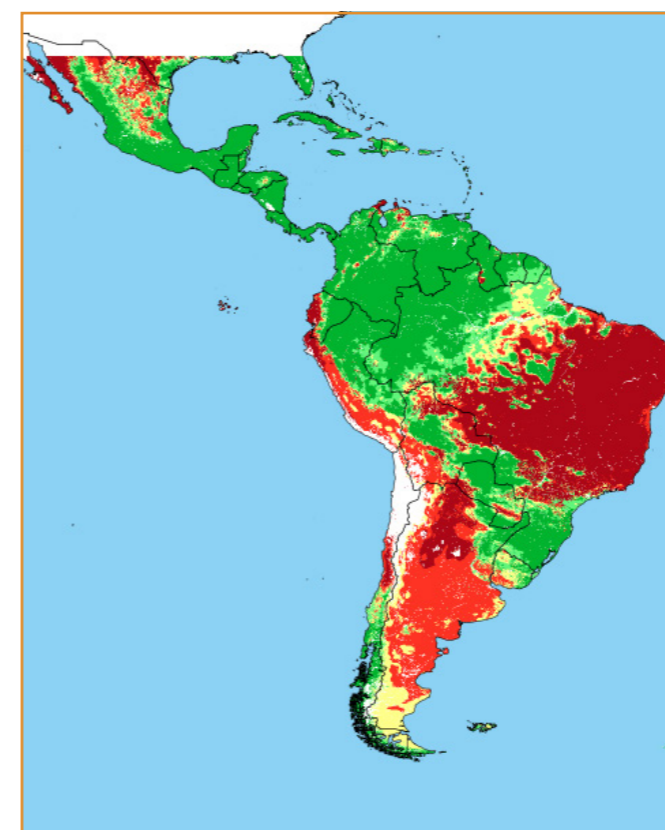
quarta-feira, 16 de setembro



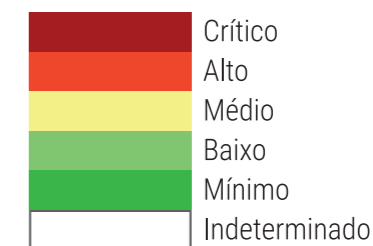
quinta-feira, 17 de setembro



sexta-feira, 18 de setembro

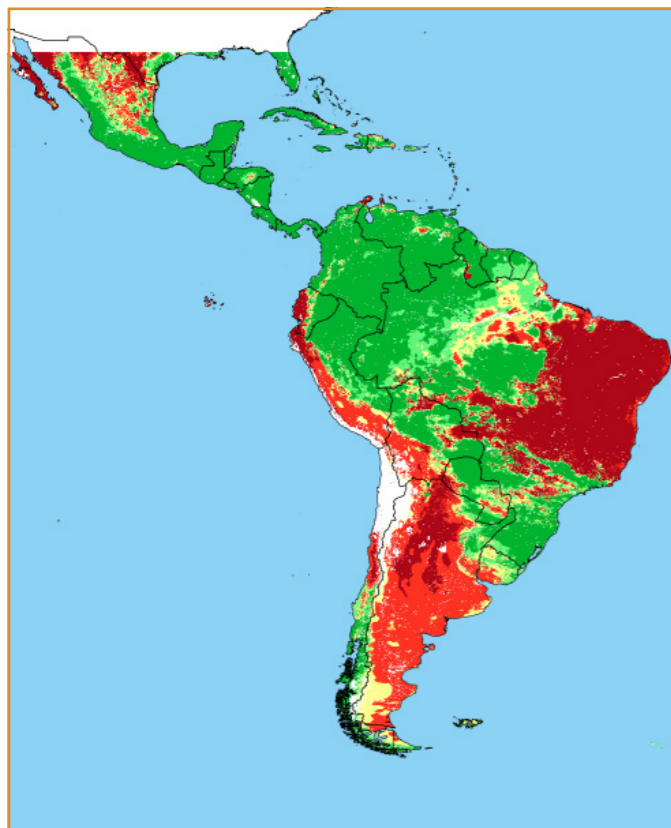


sábado, 19 de setembro

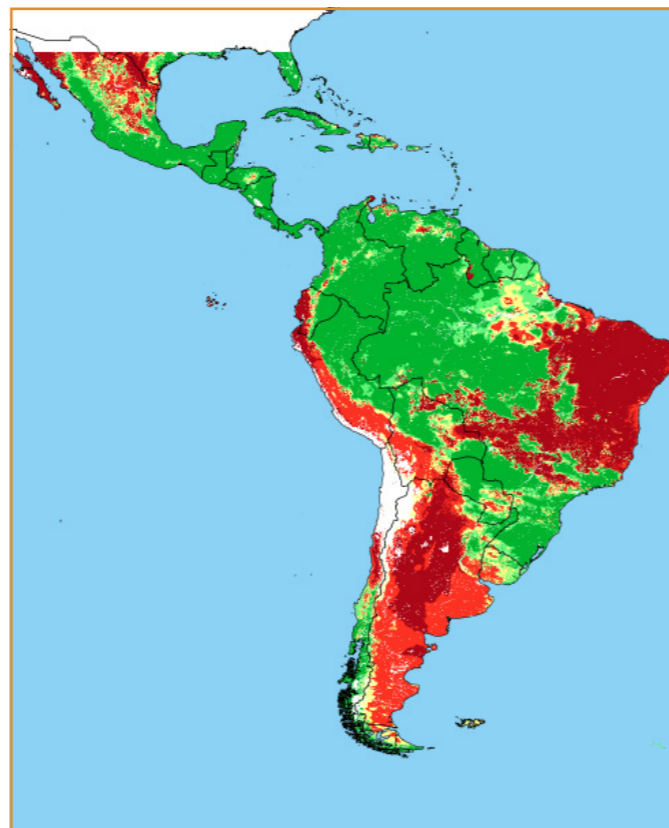


SETEMBRO / 2020						
D	S	T	Q	Q	S	S
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250	251	252	253	254	255	256
257	258	259	260	261	262	263
264	265	266	267	268	269	270
271	272	273	274			

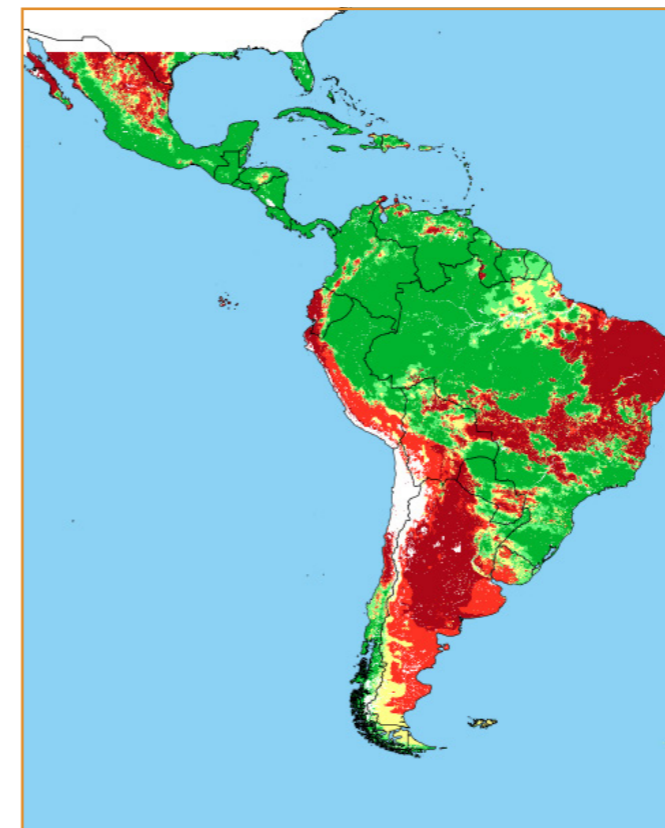
CALENDÁRIO JULIANO



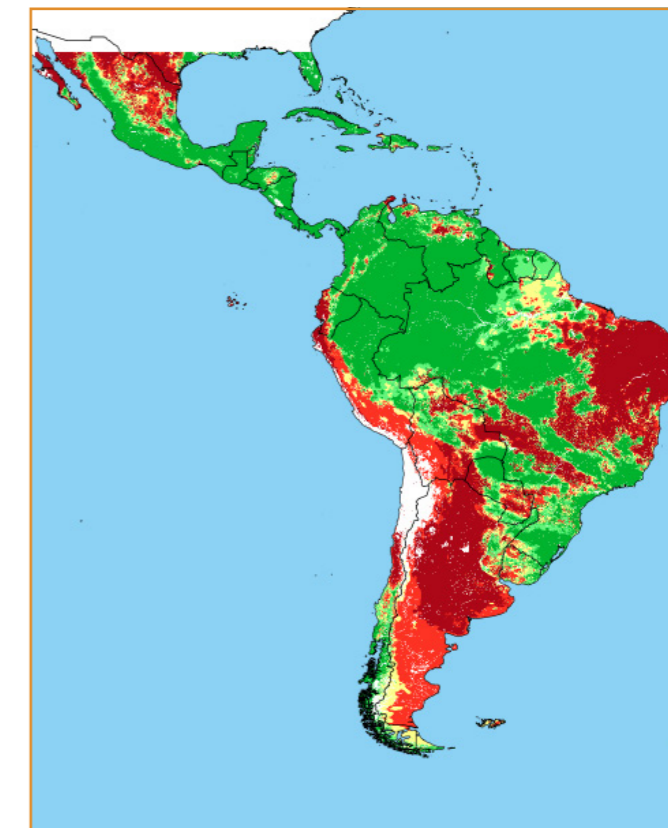
domingo, 20 de setembro



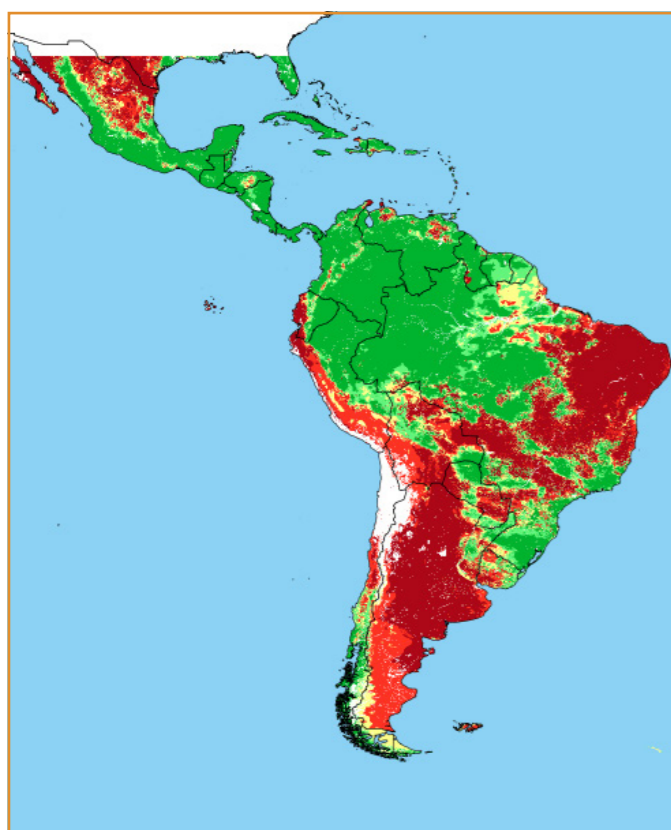
segunda-feira, 21 de setembro



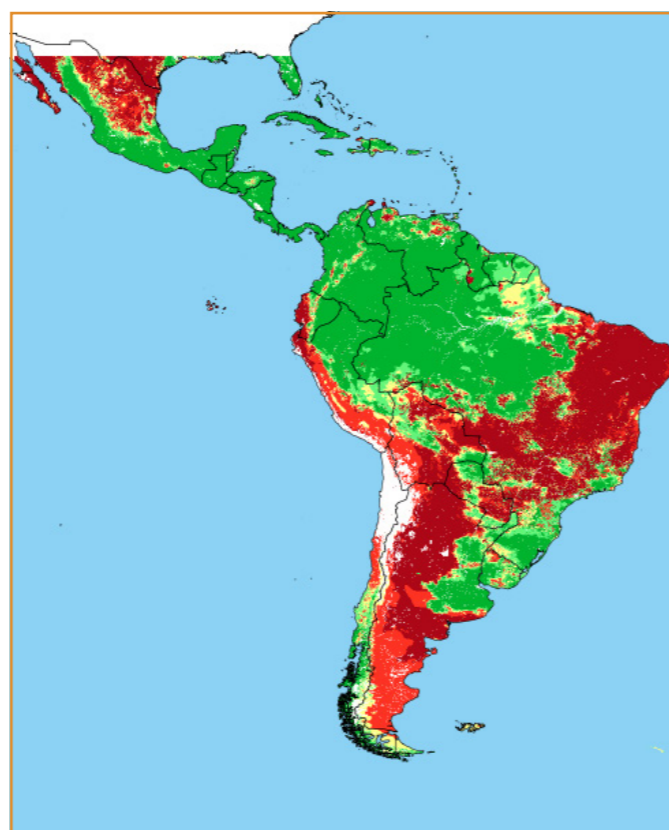
terça-feira, 22 de setembro



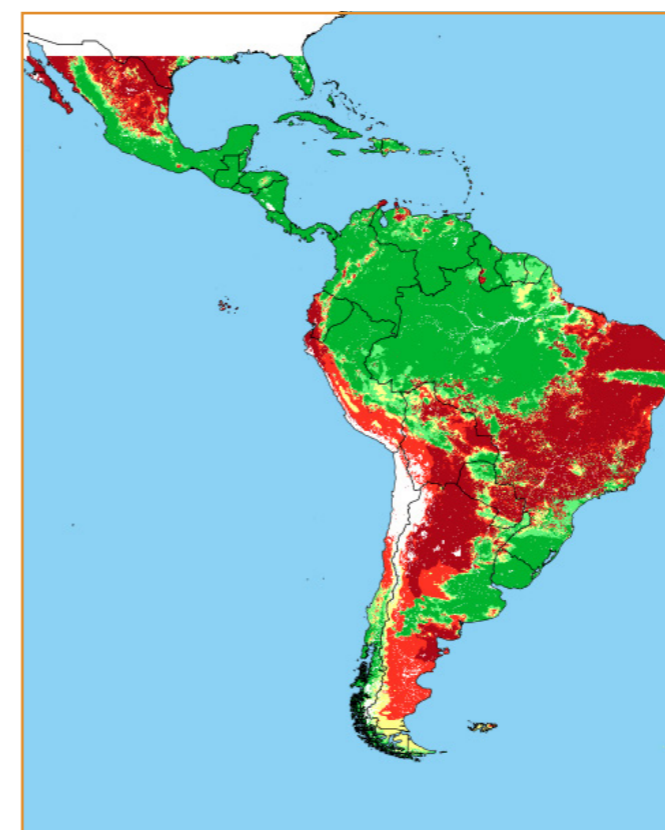
quarta-feira, 23 de setembro



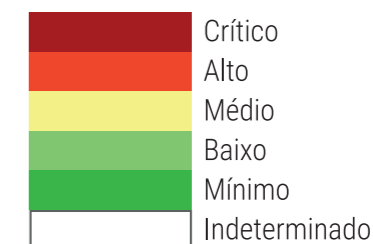
quinta-feira, 24 de setembro



sexta-feira, 25 de setembro

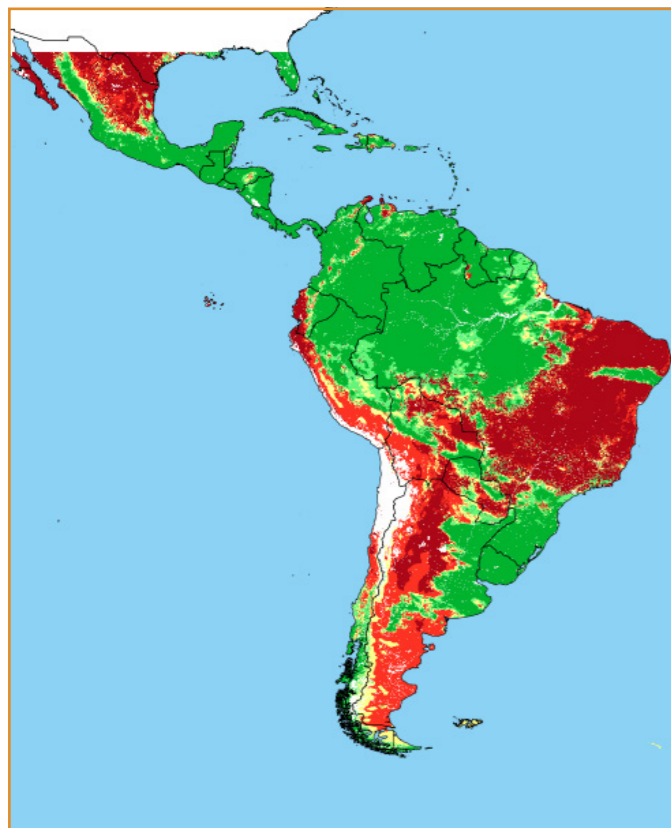


sábado, 26 de setembro

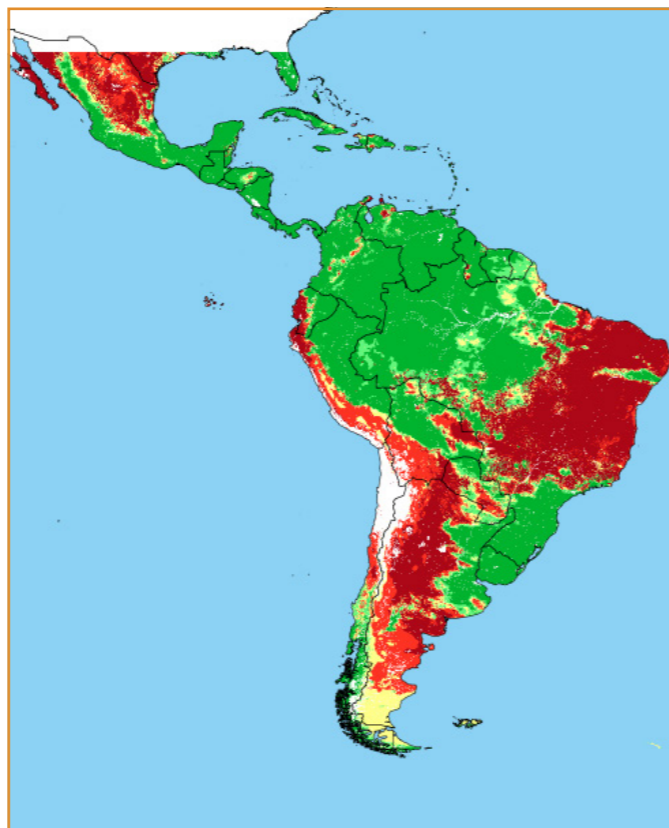


SETEMBRO / 2020						
D	S	T	Q	Q	S	S
		245	246	247	248	249
250	251	252	253	254	255	256
257	258	259	260	261	262	263
264	265	266	267	268	269	270
271	272	273	274			

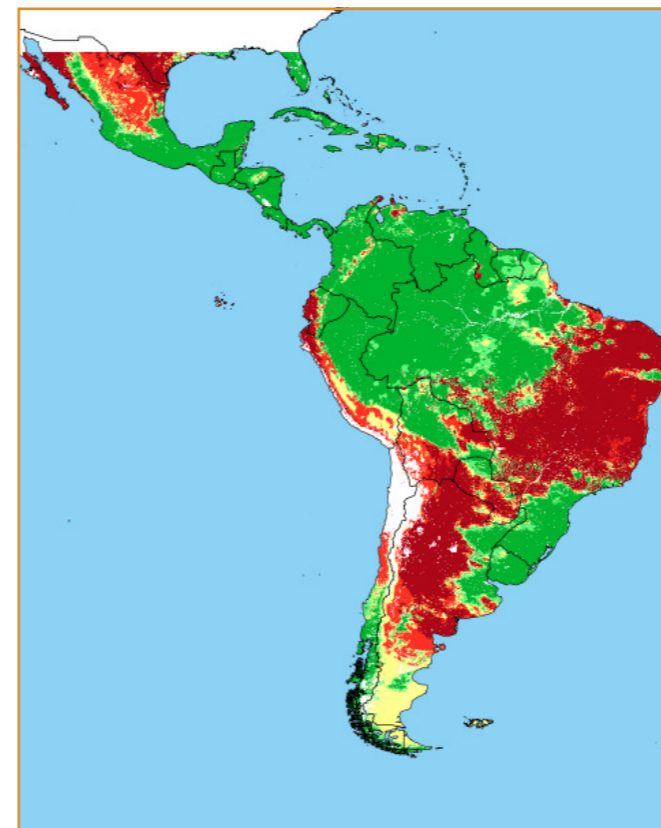
CALENDÁRIO JULIANO



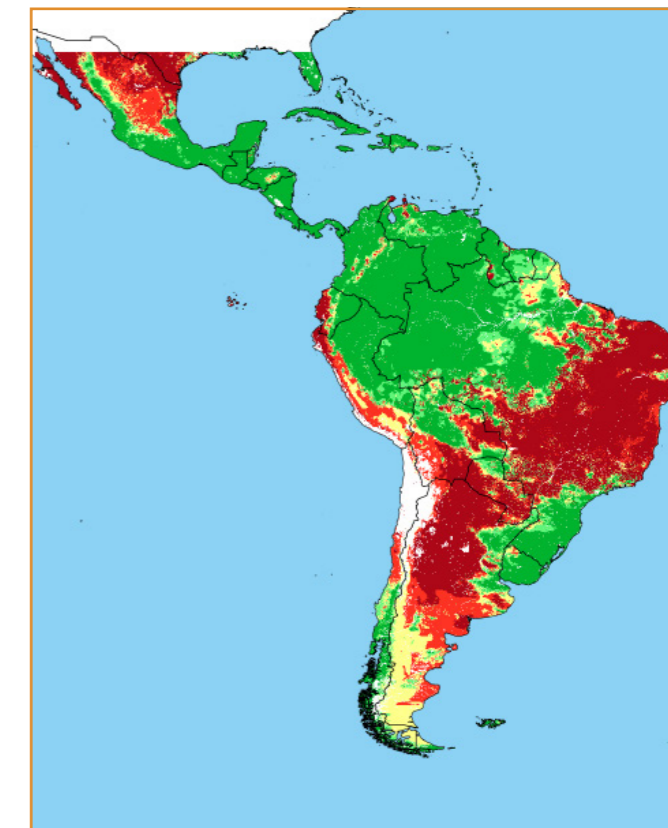
domingo, 27 de setembro



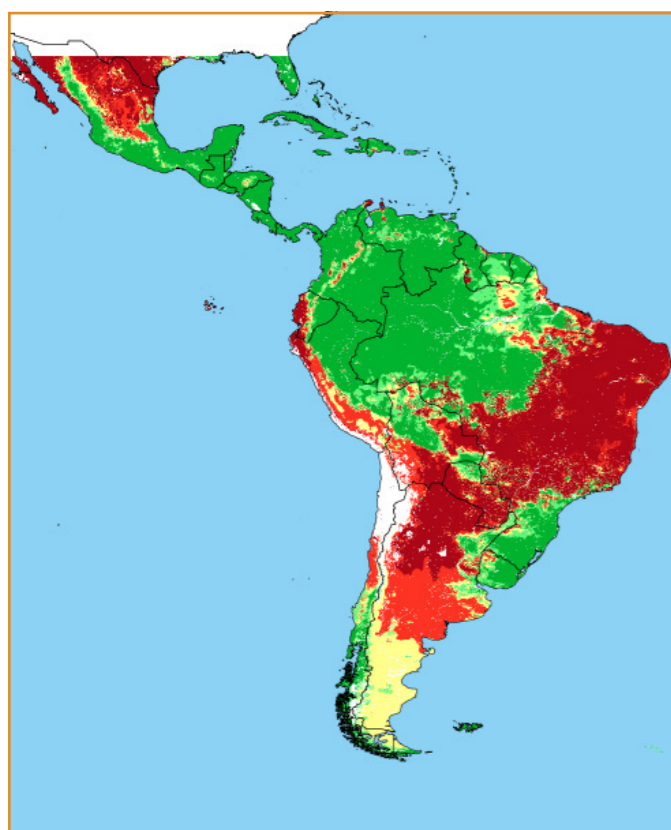
segunda-feira, 28 de setembro



terça-feira, 29 de setembro



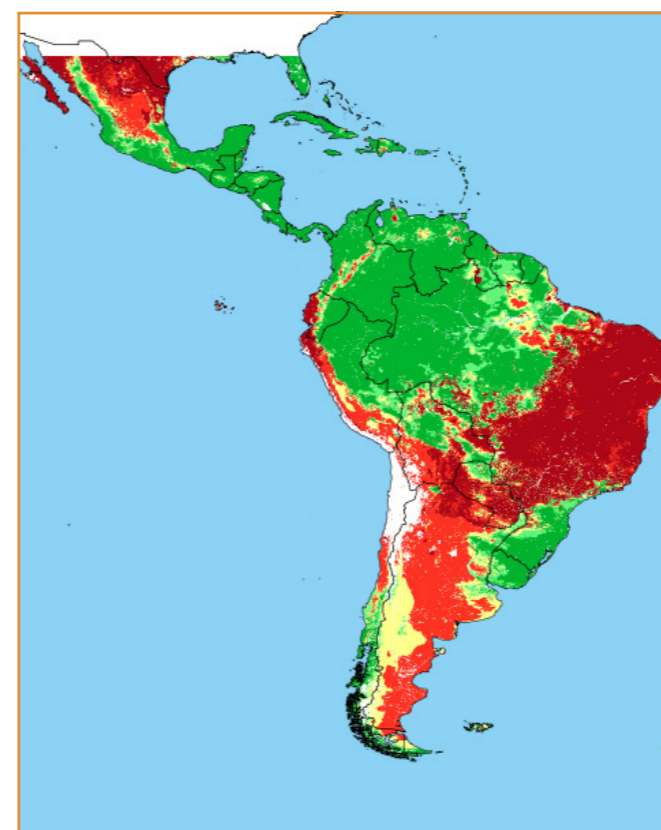
quarta-feira, 30 de setembro



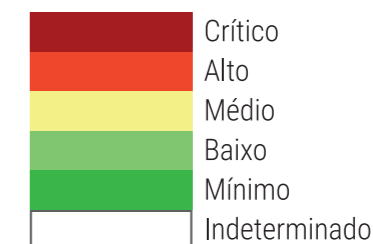
quinta-feira, 1 de outubro



sexta-feira, 2 de outubro



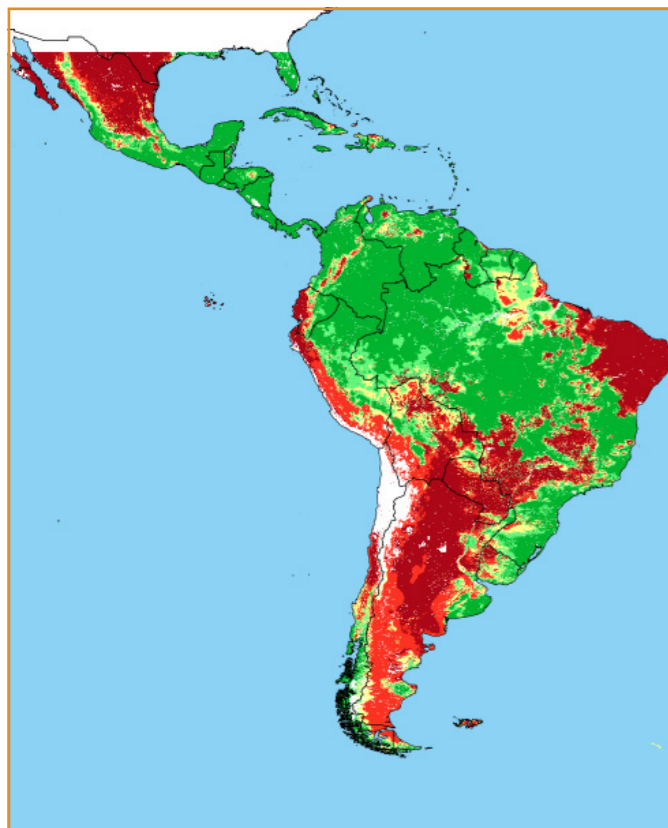
sábado, 3 de outubro



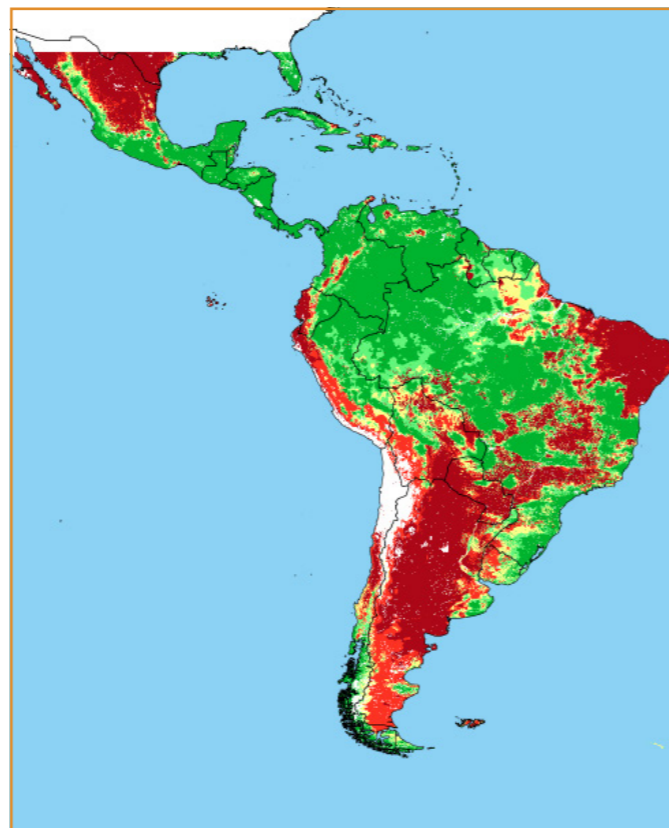
SETEMBRO / 2020						
D	S	T	Q	Q	S	S
		245	246	247	248	249
250	251	252	253	254	255	256
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264	265	266	267	268	269	270
271	272	273	274	275	276	277

CALENDÁRIO JULIANO

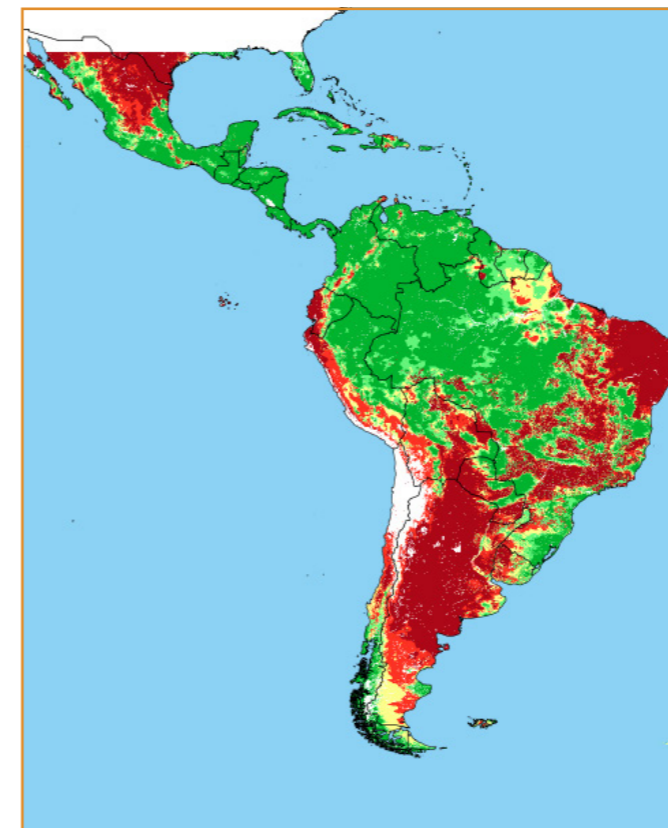




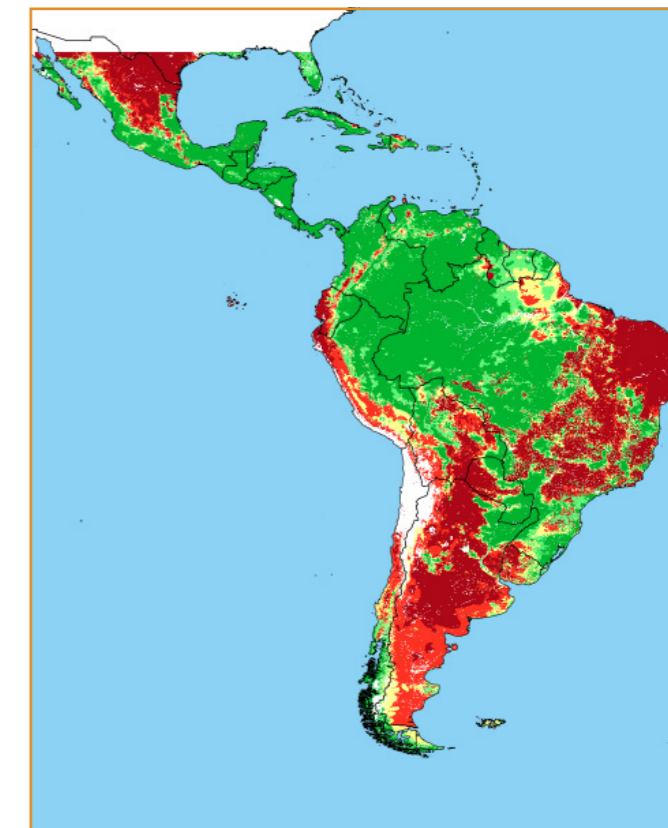
domingo, 11 de outubro



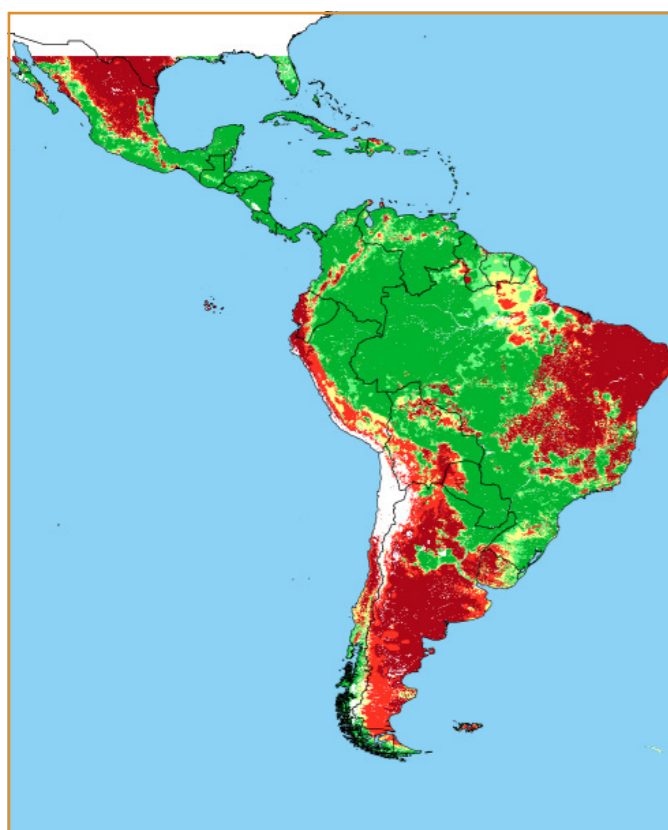
segunda-feira, 12 de outubro



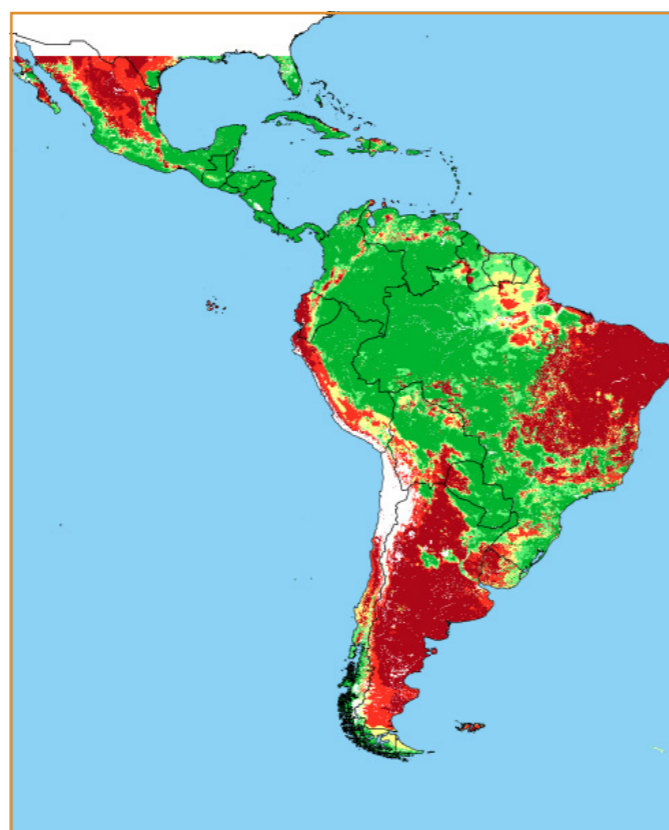
terça-feira, 13 de outubro



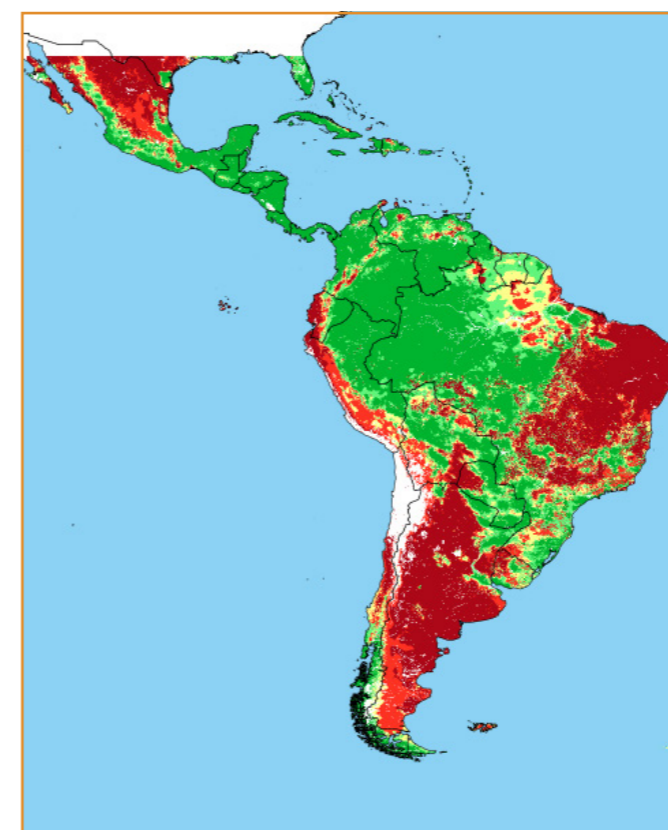
quarta-feira, 14 de outubro



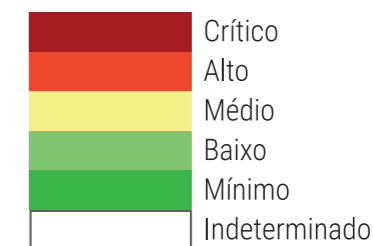
quinta-feira, 15 de outubro



sexta-feira, 16 de outubro



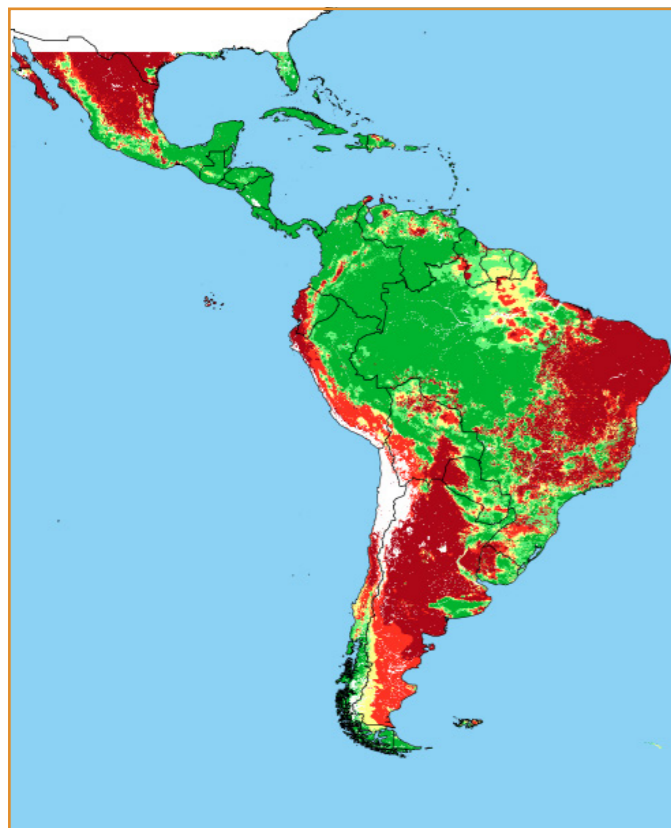
sábado, 17 de outubro



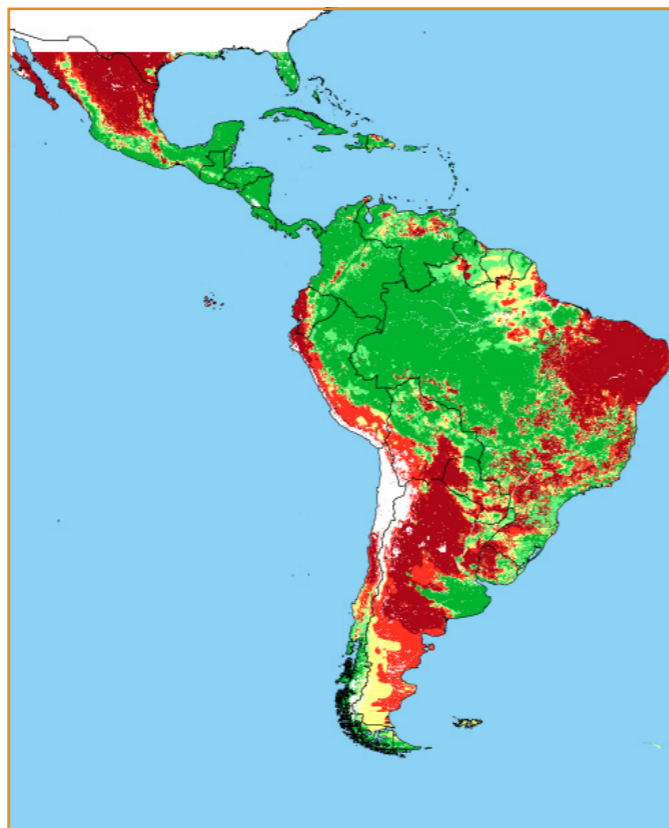
OUTUBRO / 2020														
D	S	T	Q	Q	S	S								
												275	276	277
278	279	280	281	282	283	284								
285	286	287	288	289	290	291								
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299	300	301	302	303	304	305								

CALENDÁRIO JULIANO

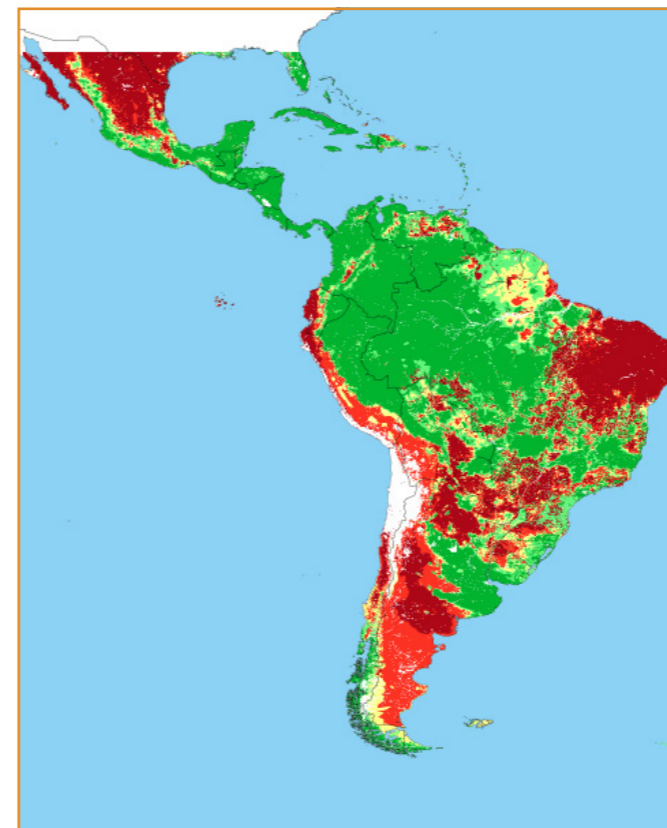




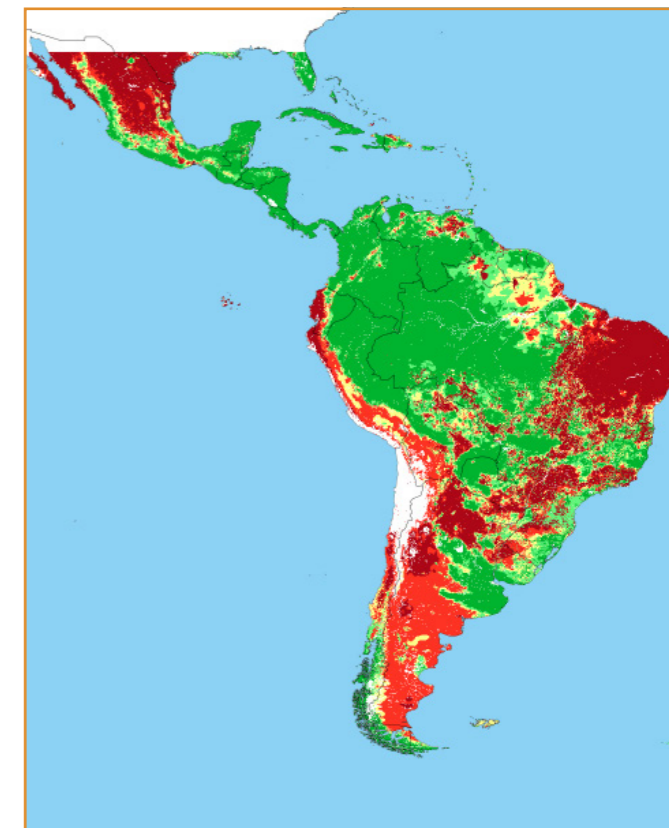
domingo, 18 de outubro



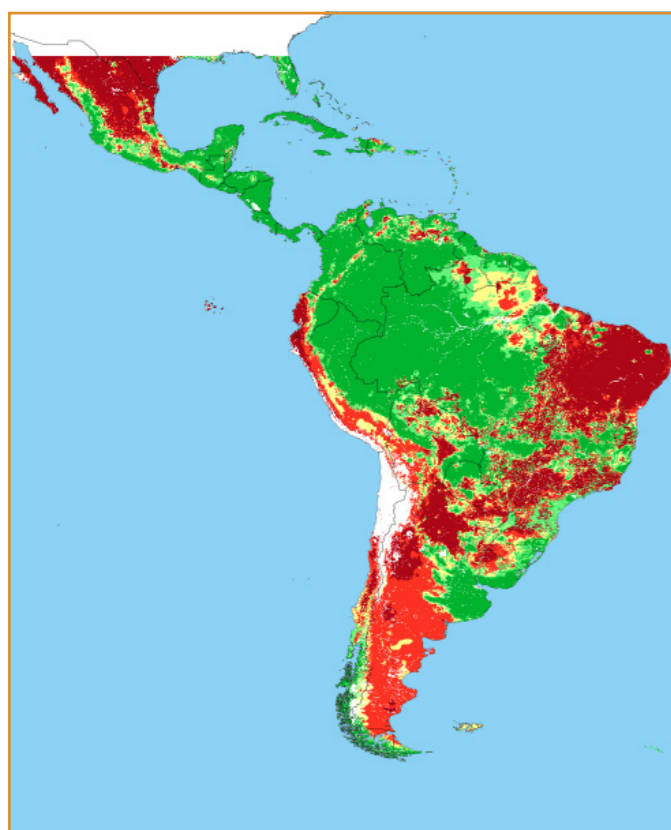
segunda-feira, 19 de outubro



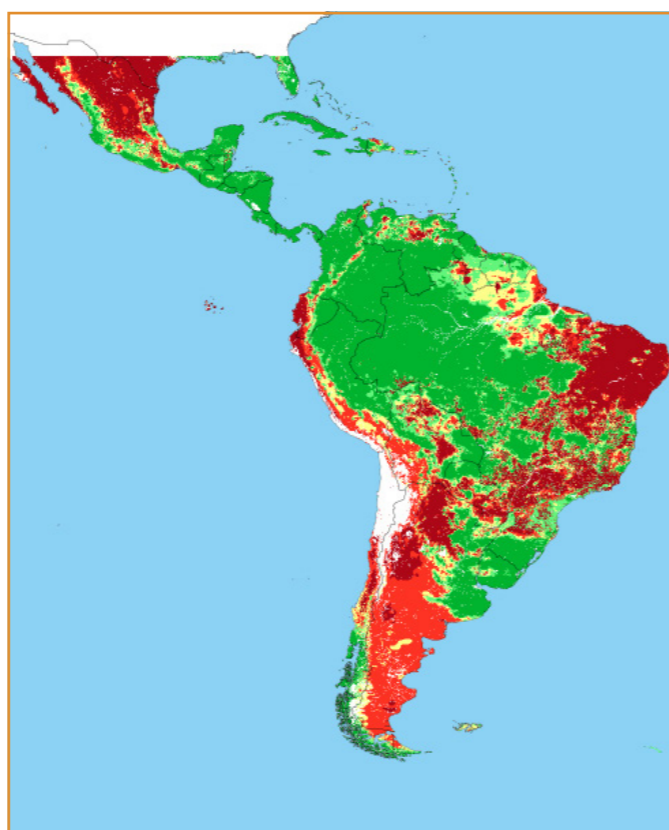
terça-feira, 20 de outubro



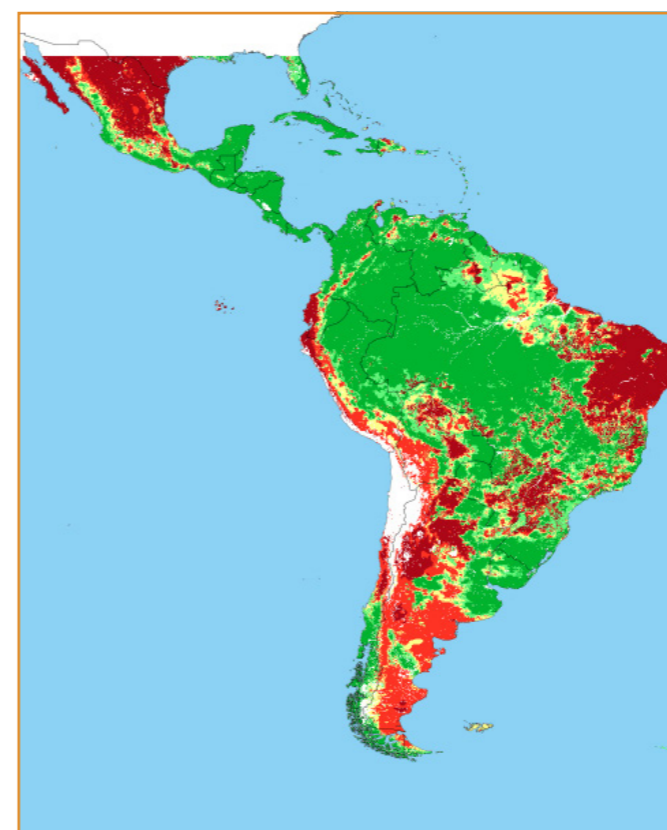
quarta-feira, 21 de outubro



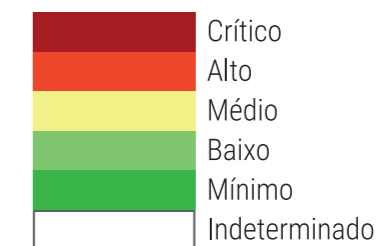
quinta-feira, 22 de outubro



sexta-feira, 23 de outubro

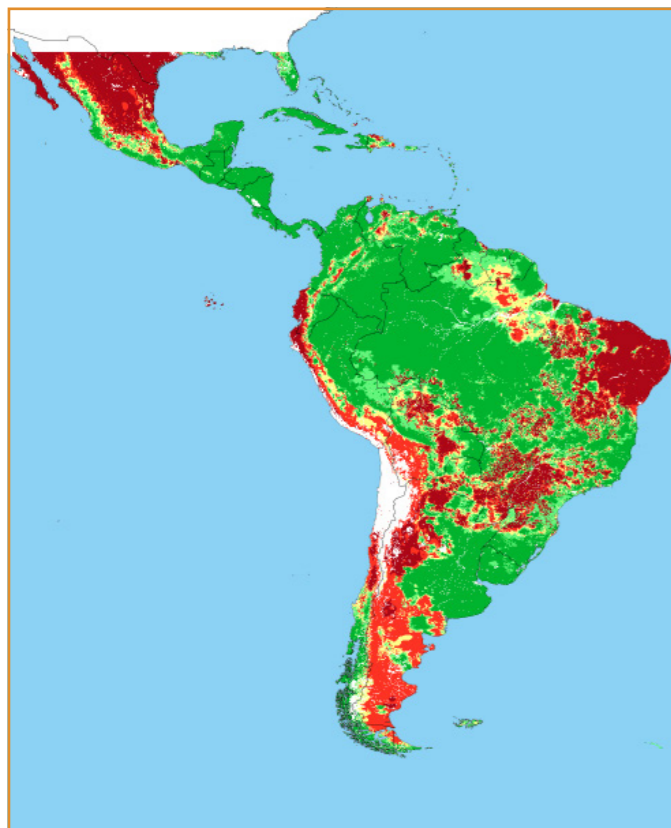


sábado, 24 de outubro

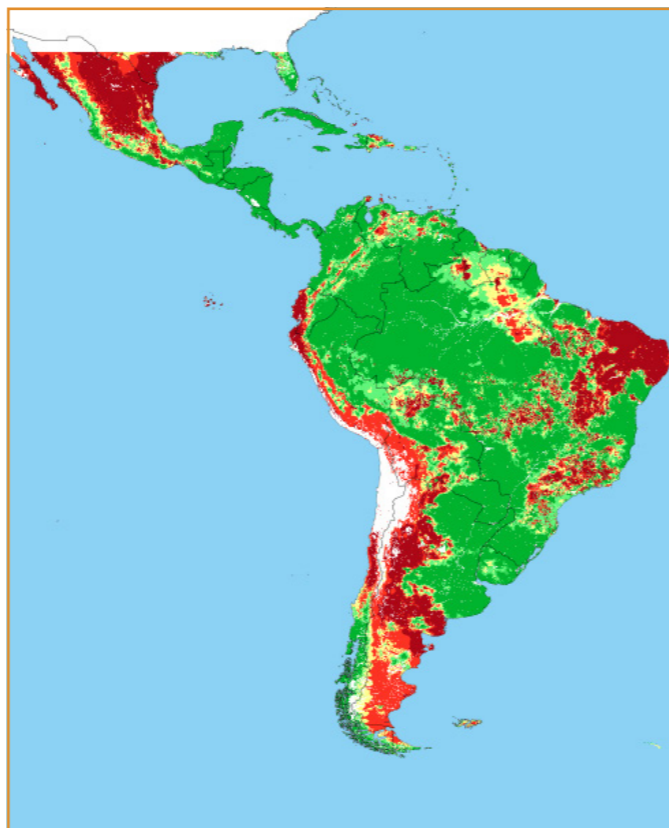


OUTUBRO / 2020														
D	S	T	Q	Q	S	S								
												275	276	277
278	279	280	281	282	283	284								
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292	293	294	295	296	297	298								
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CALENDÁRIO JULIANO



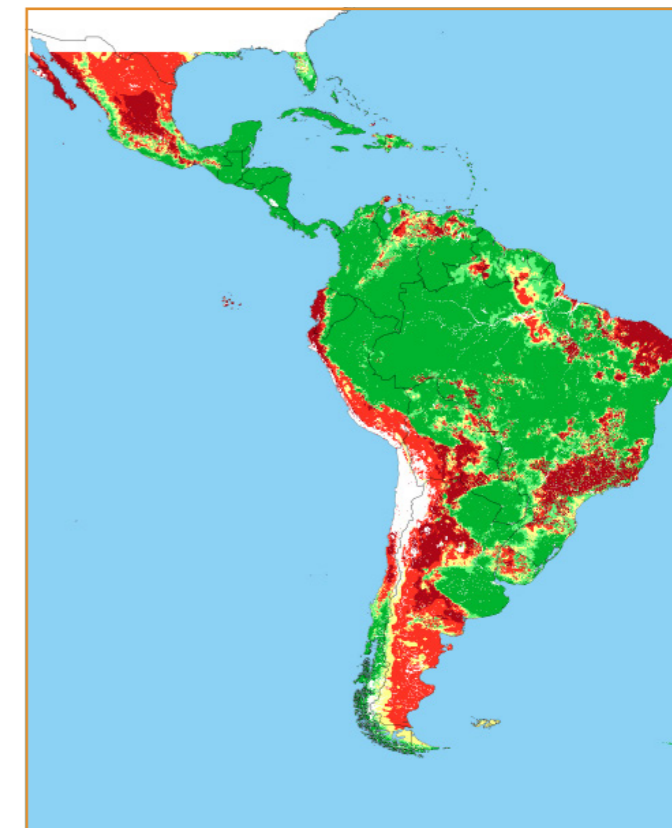
domingo, 25 de outubro



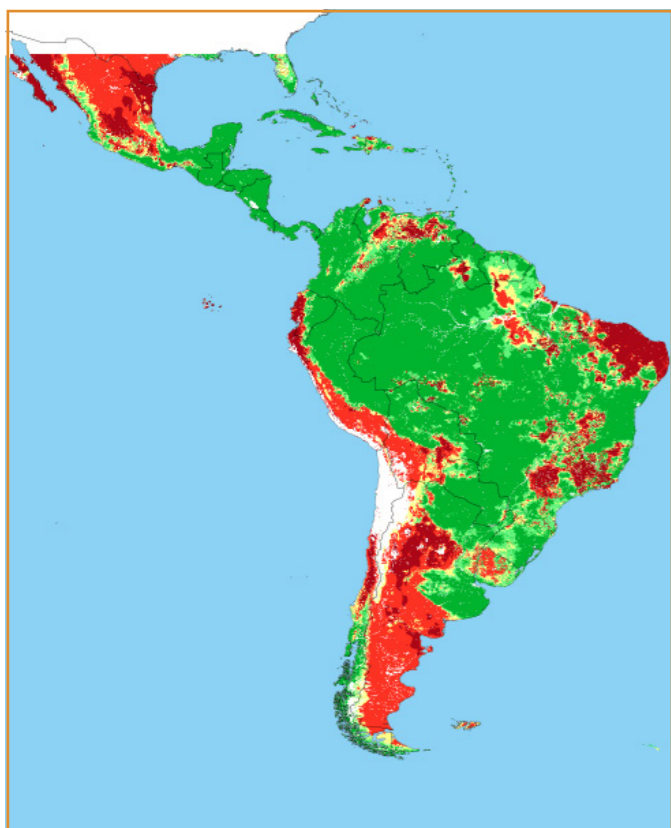
segunda-feira, 26 de outubro



terça-feira, 27 de outubro



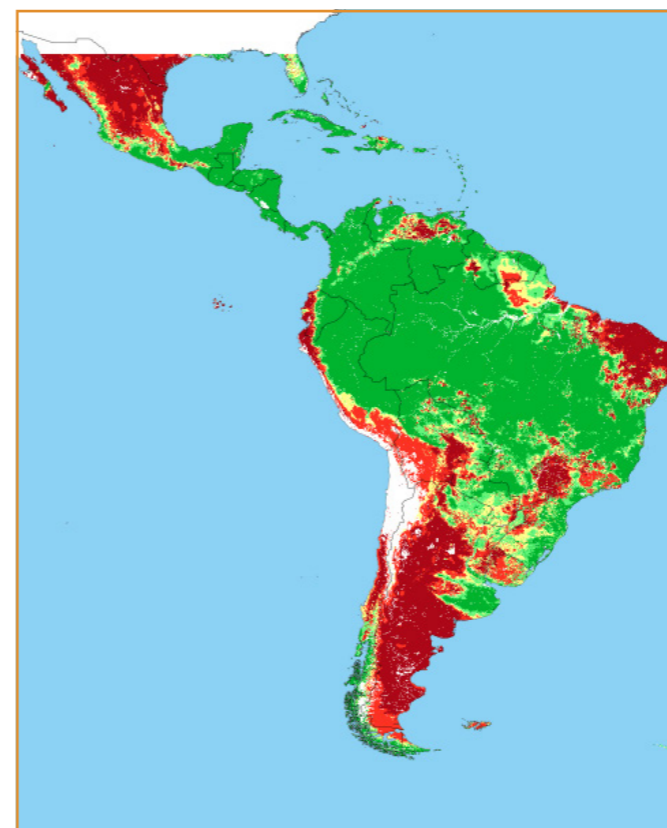
quarta-feira, 28 de outubro



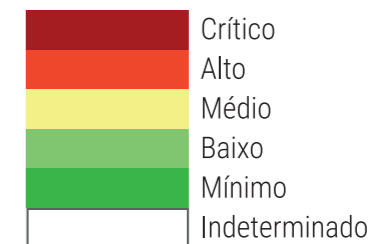
quinta-feira, 29 de outubro



sexta-feira, 30 de outubro

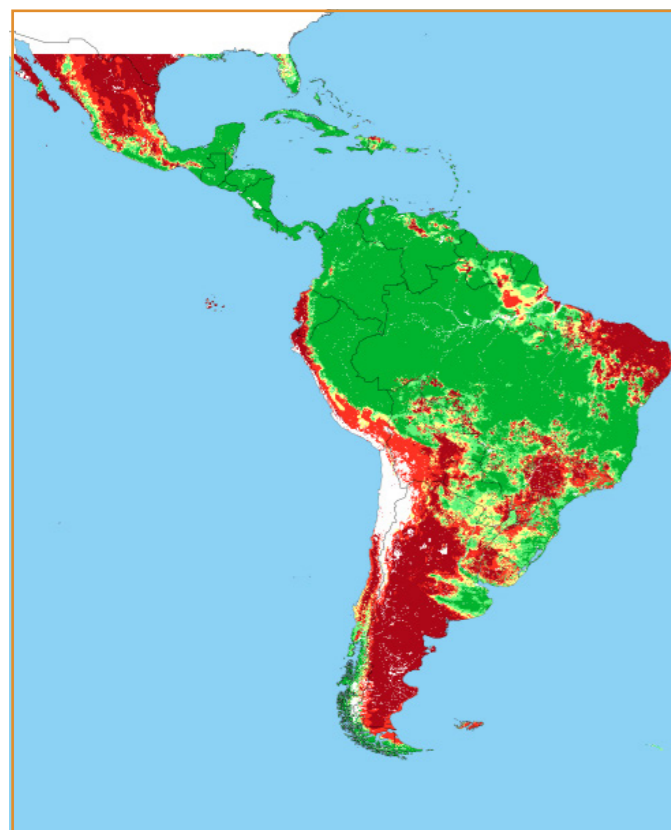


sábado, 31 de outubro

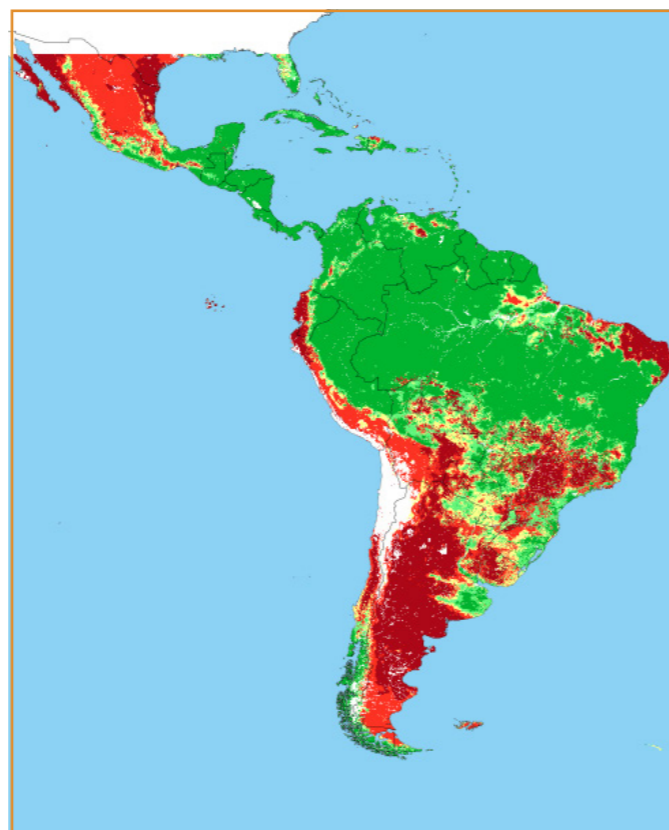


OUTUBRO / 2020														
D	S	T	Q	Q	S	S								
												275	276	277
278	279	280	281	282	283	284								
285	286	287	288	289	290	291								
292	293	294	295	296	297	298								
299	300	301	302	303	304	305								

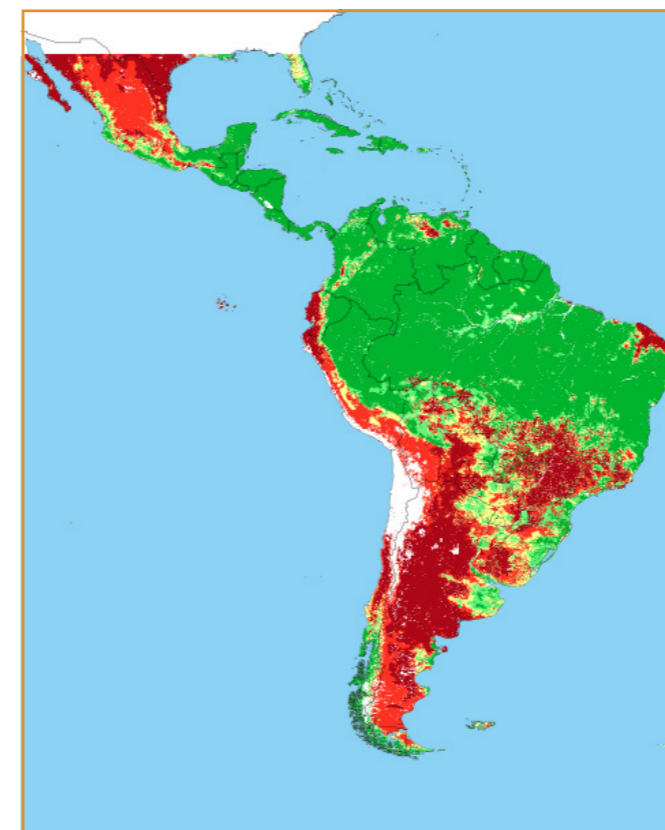
CALENDÁRIO JULIANO



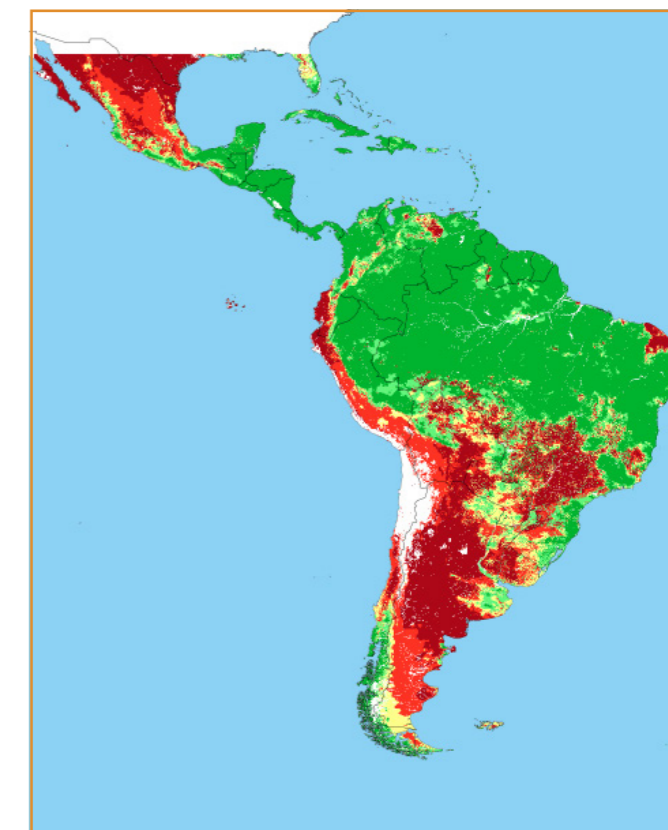
domingo, 1 de novembro



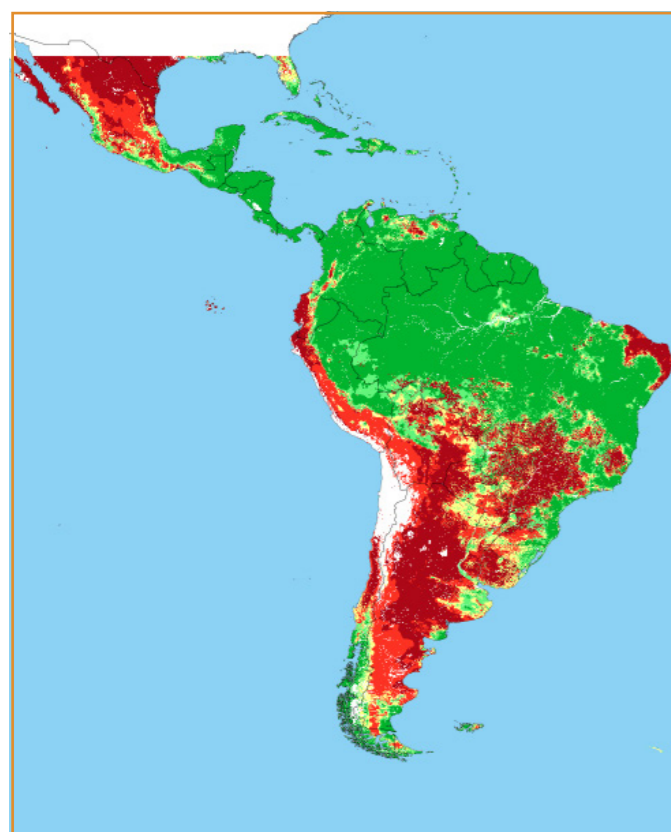
segunda-feira, 2 de novembro



terça-feira, 3 de novembro



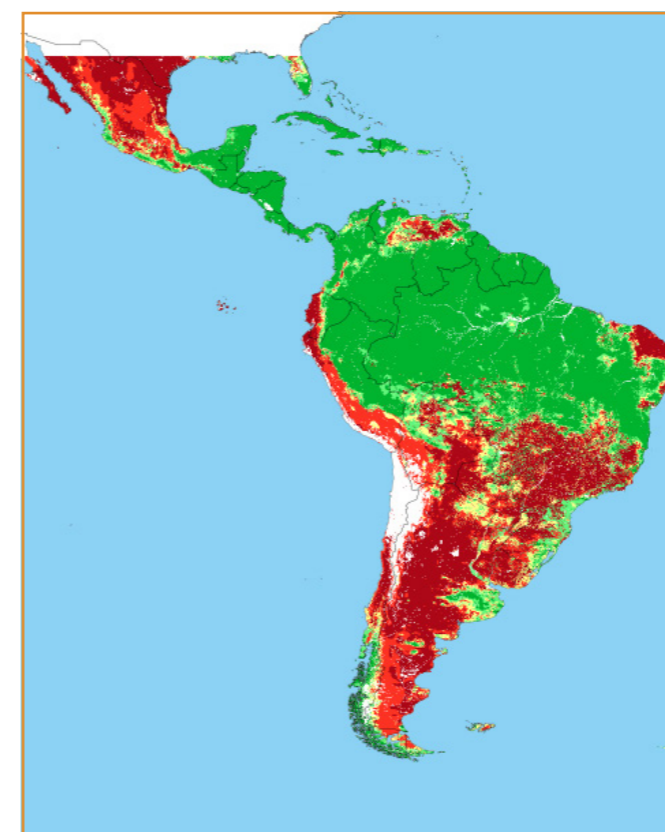
quarta-feira, 4 de novembro



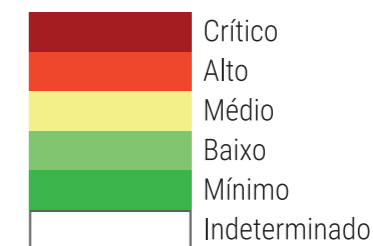
quinta-feira, 5 de novembro



sexta-feira, 6 de novembro

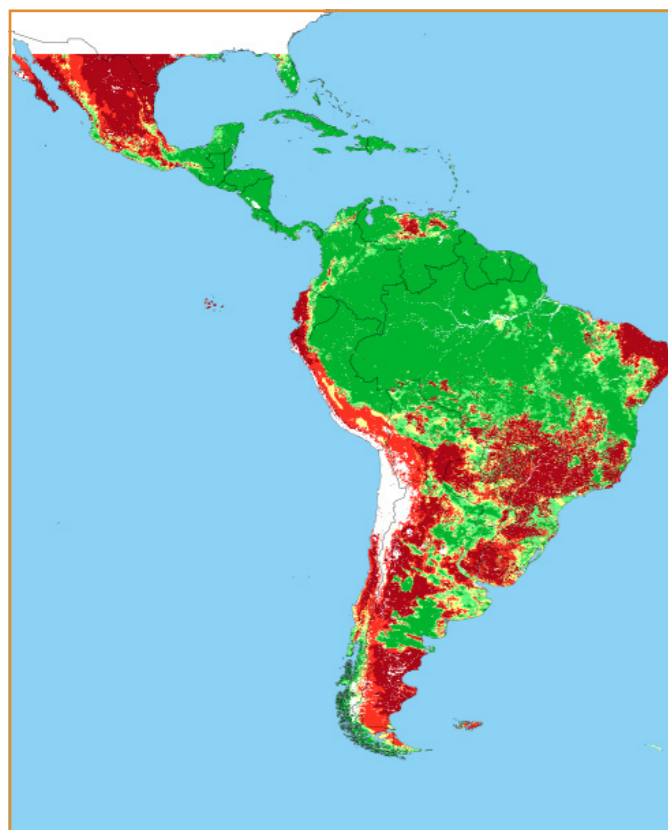


sábado, 7 de novembro

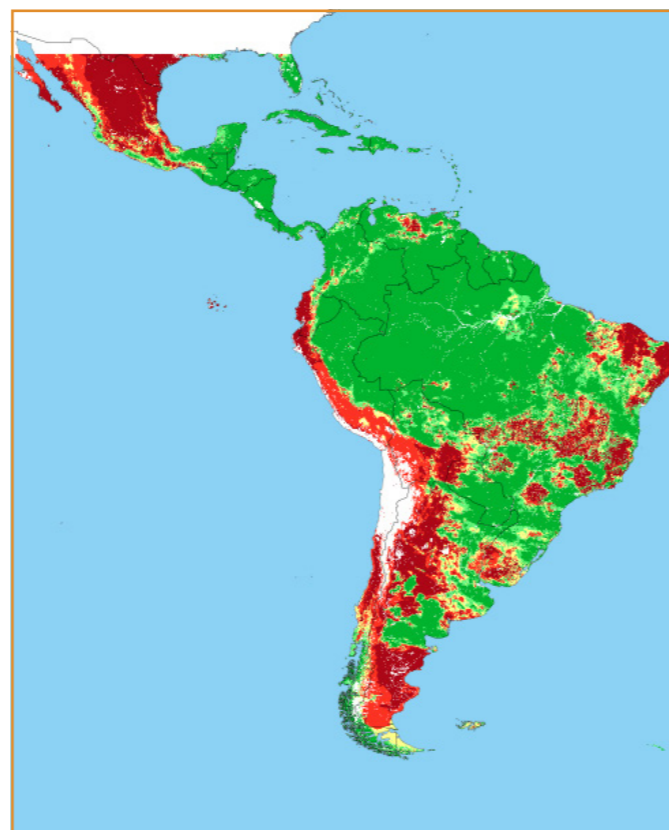


NOVEMBRO / 2020							
D	S	T	Q	Q	S	S	
306	307	308	309	310	311	312	
313	314	315	316	317	318	319	
320	321	322	323	324	325	326	
327	328	329	330	331	332	333	
334	335						

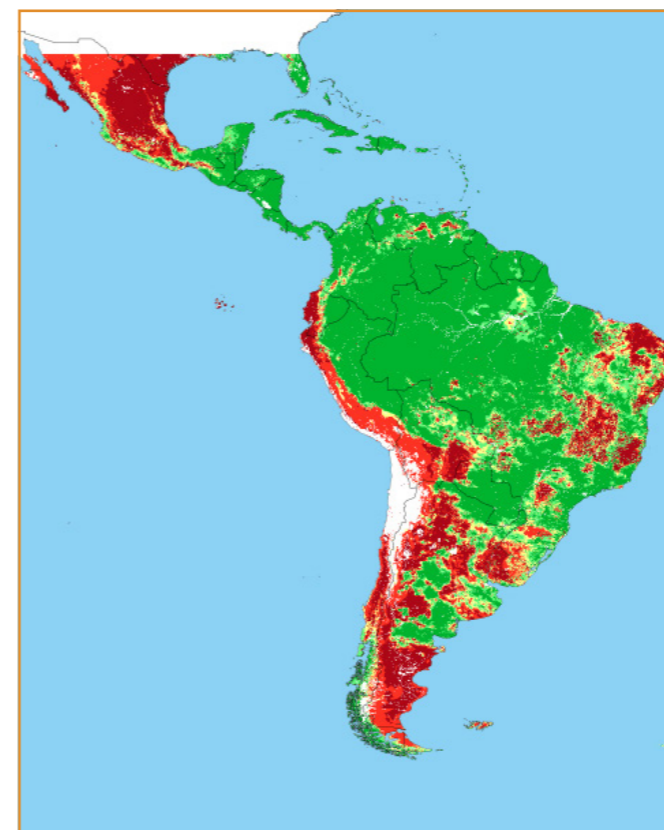
CALENDÁRIO JULIANO



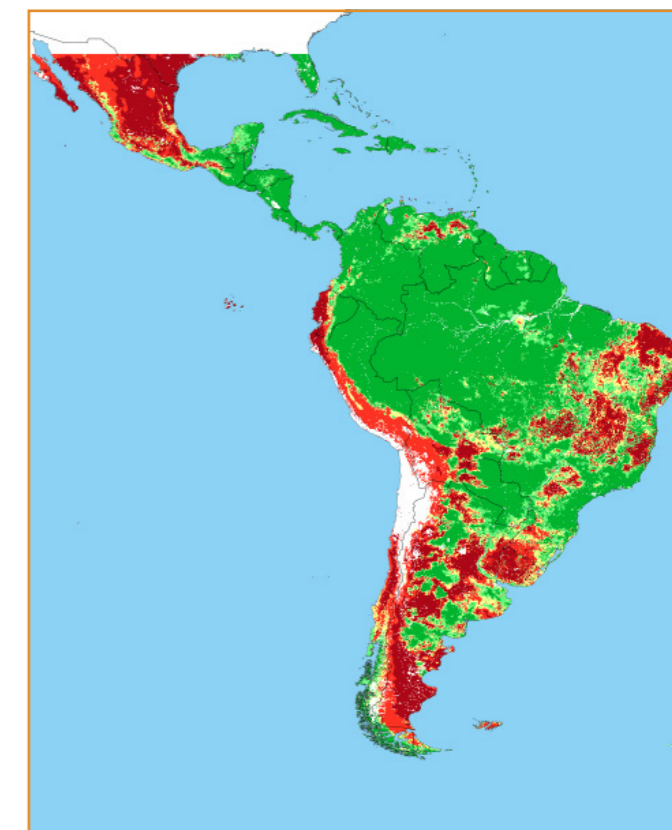
domingo, 8 de novembro



segunda-feira, 9 de novembro



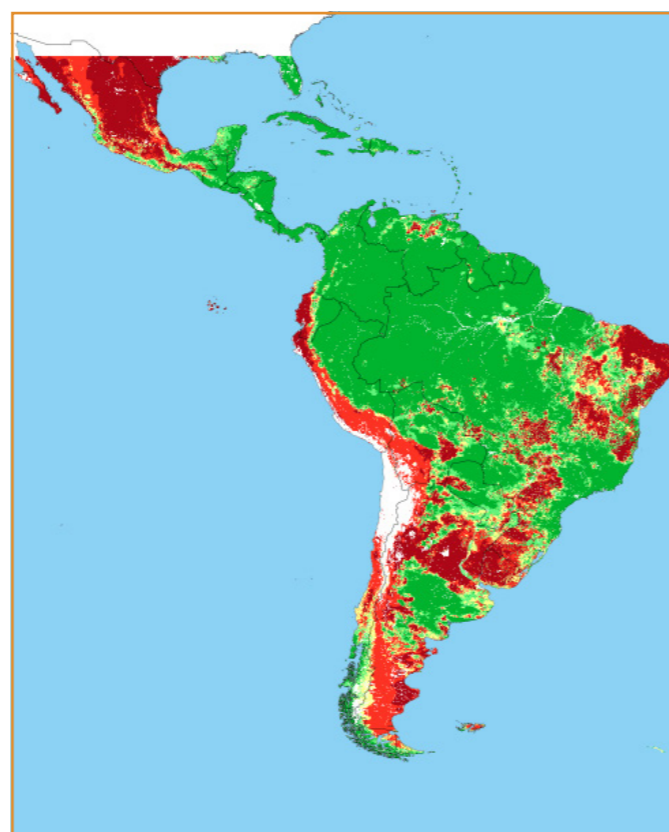
terça-feira, 10 de novembro



quarta-feira, 11 de novembro



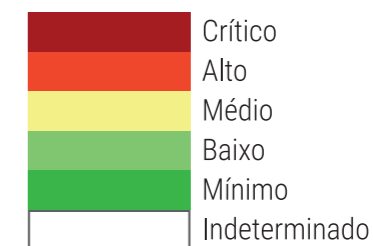
quinta-feira, 12 de novembro



sexta-feira, 13 de novembro



sábado, 14 de novembro



NOVEMBRO / 2020						
D	S	T	Q	Q	S	S
306	307	308	309	310	311	312
313	314	315	316	317	318	319
320	321	322	323	324	325	326
327	328	329	330	331	332	333
334	335					

CALENDÁRIO JULIANO



domingo, 15 de novembro



segunda-feira, 16 de novembro



terça-feira, 17 de novembro



quarta-feira, 18 de novembro



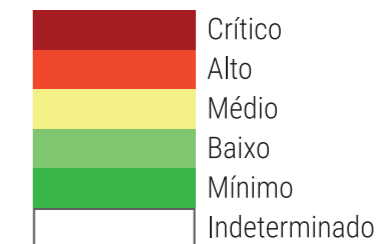
quinta-feira, 19 de novembro



sexta-feira, 20 de novembro



sábado, 21 de novembro

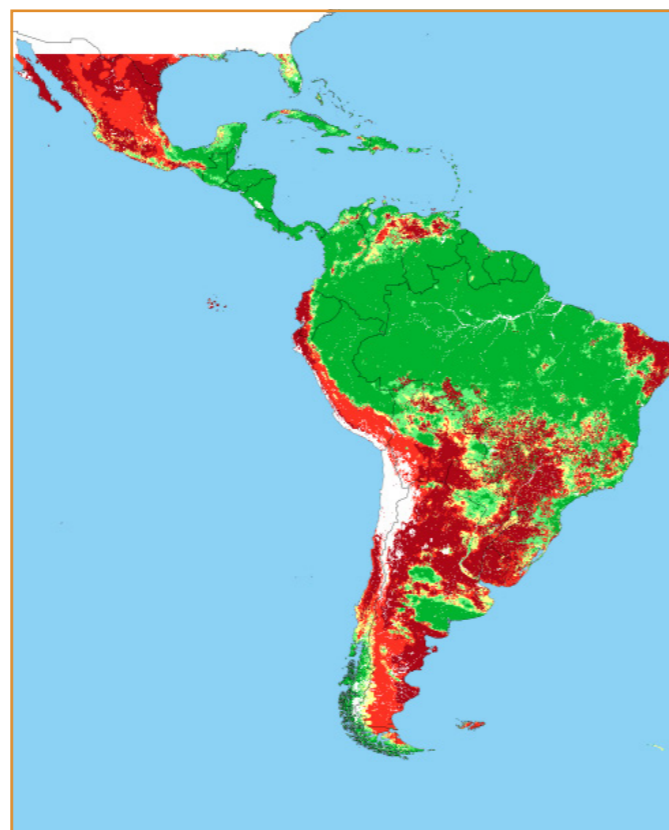


NOVEMBRO / 2020						
D	S	T	Q	Q	S	S
306	307	308	309	310	311	312
313	314	315	316	317	318	319
320	321	322	323	324	325	326
327	328	329	330	331	332	333
334	335					

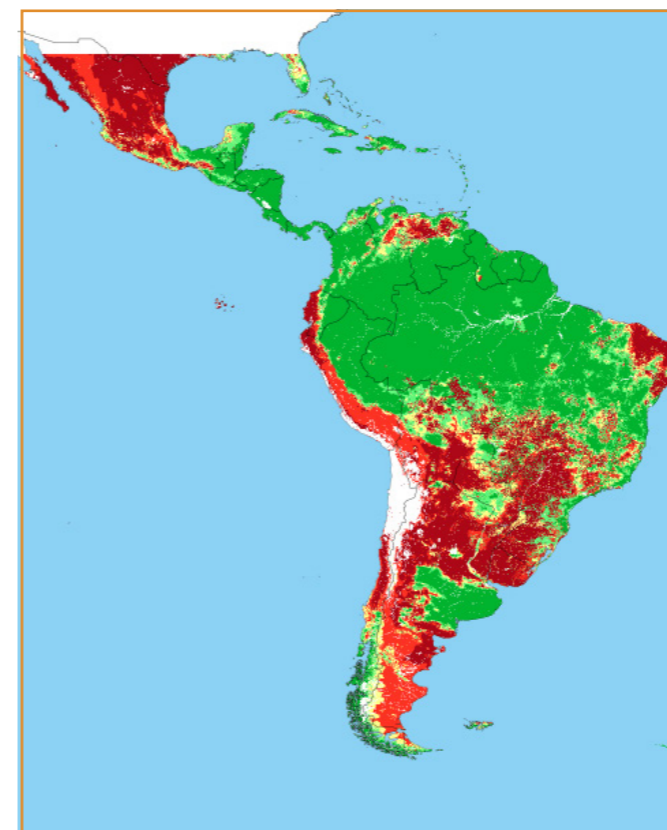
CALENDÁRIO JULIANO



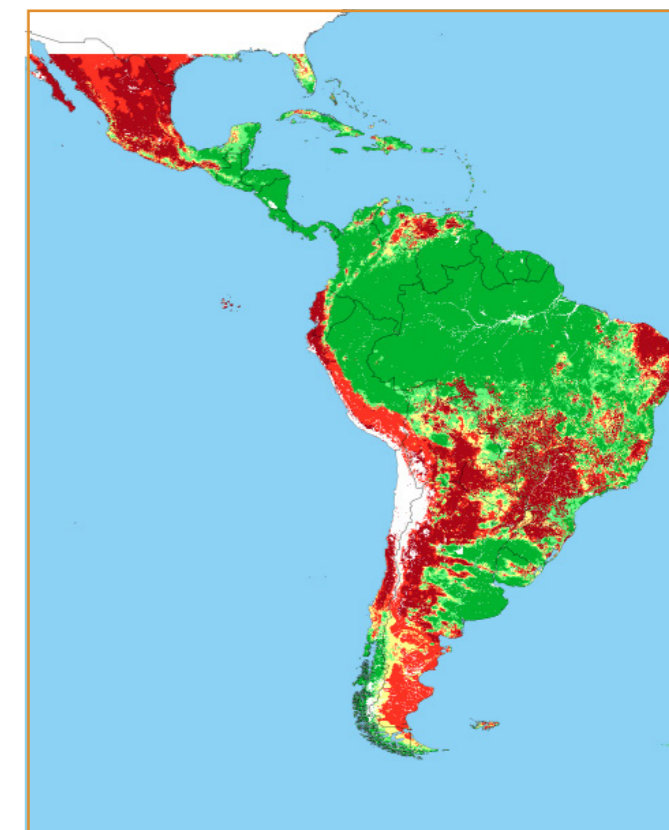
domingo, 22 de novembro



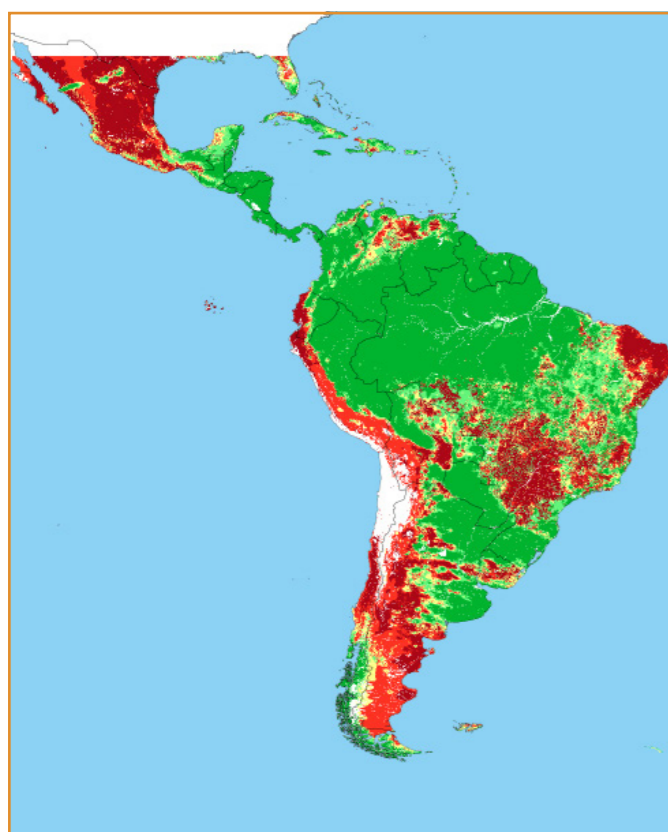
segunda-feira, 23 de novembro



terça-feira, 24 de novembro



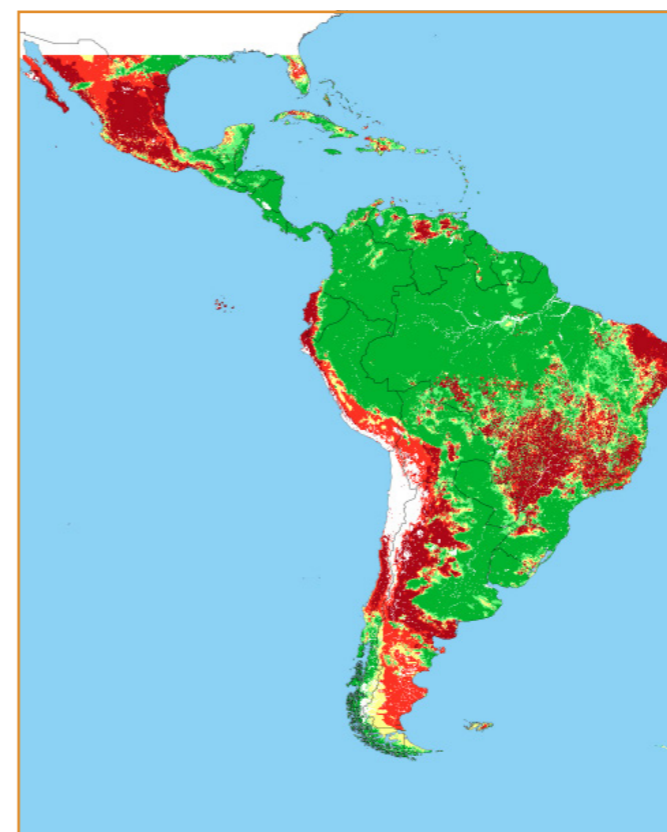
quarta-feira, 25 de novembro



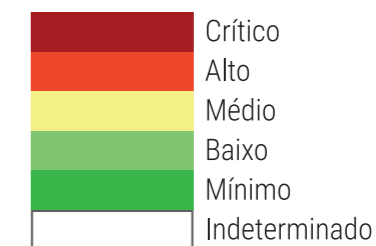
quinta-feira, 26 de novembro



sexta-feira, 27 de novembro



sábado, 28 de novembro



NOVEMBRO / 2020						
D	S	T	Q	Q	S	S
306	307	308	309	310	311	312
313	314	315	316	317	318	319
320	321	322	323	324	325	326
327	328	329	330	331	332	333
334	335					

CALENDÁRIO JULIANO



domingo, 29 de novembro



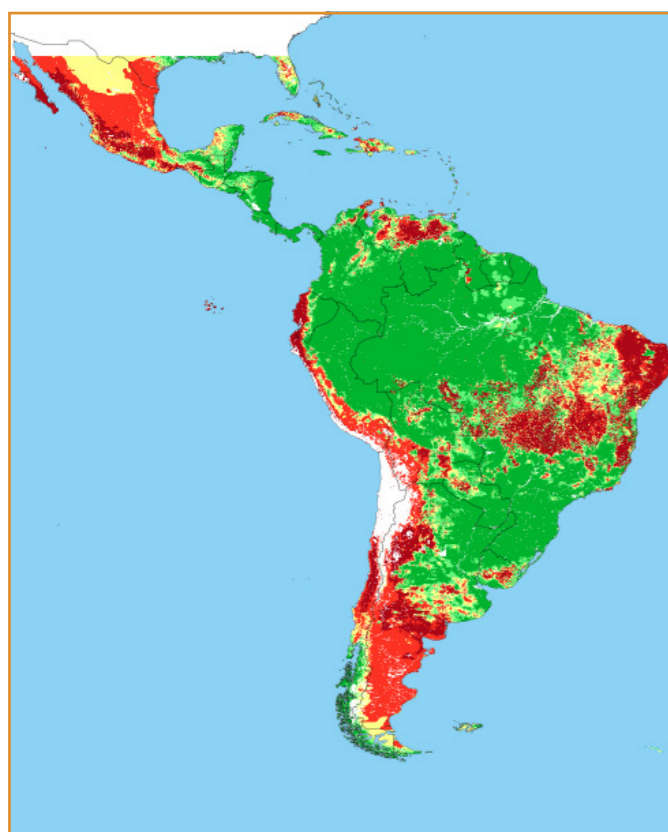
segunda-feira, 30 de novembro



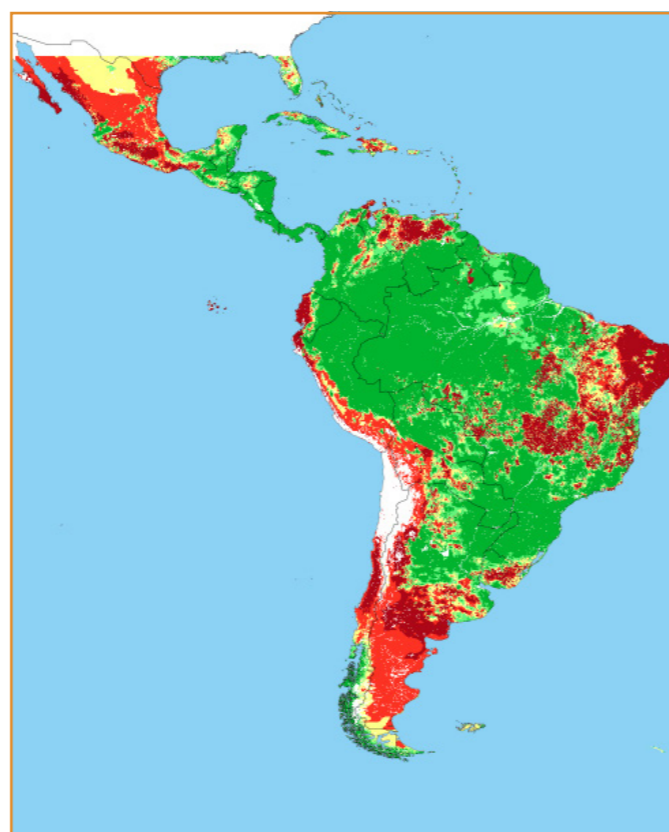
terça-feira, 1 de dezembro



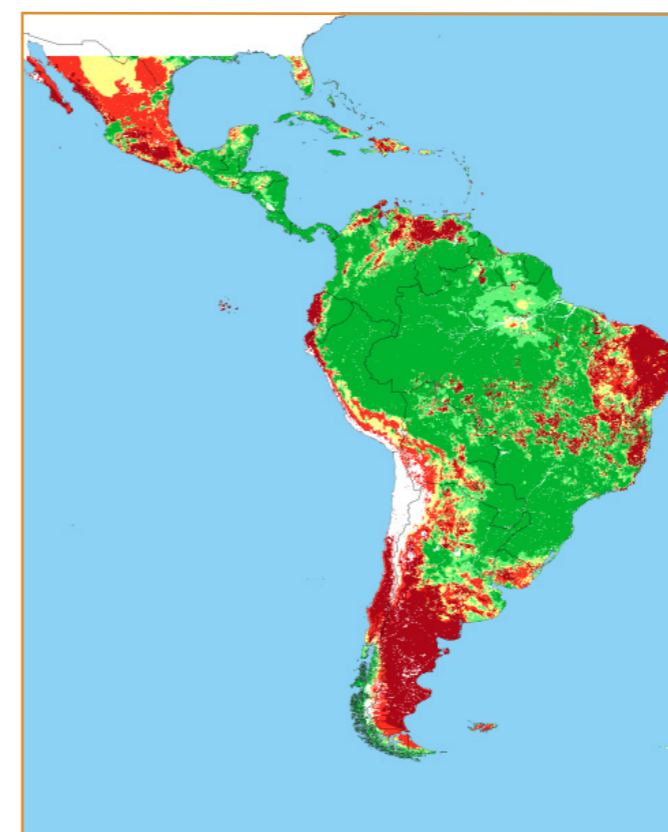
quarta-feira, 2 de dezembro



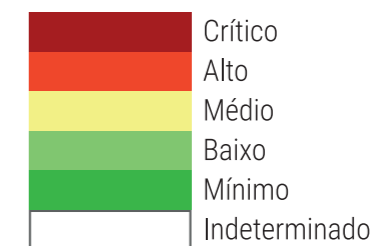
quinta-feira, 3 de dezembro



sexta-feira, 4 de dezembro



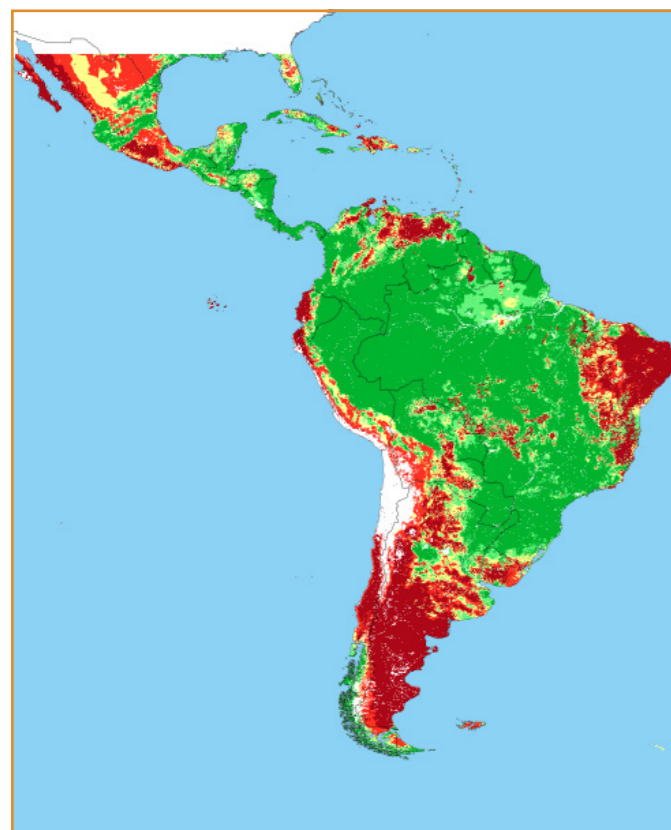
sábado, 5 de dezembro



DEZEMBRO / 2020

D	S	T	Q	Q	S	S
334	335	336	337	338	339	340
341	342	343	344	345	346	347
348	349	350	351	352	353	354
355	356	357	358	359	360	361
362	363	364	365	366		

CALENDÁRIO JULIANO



domingo, 6 de dezembro



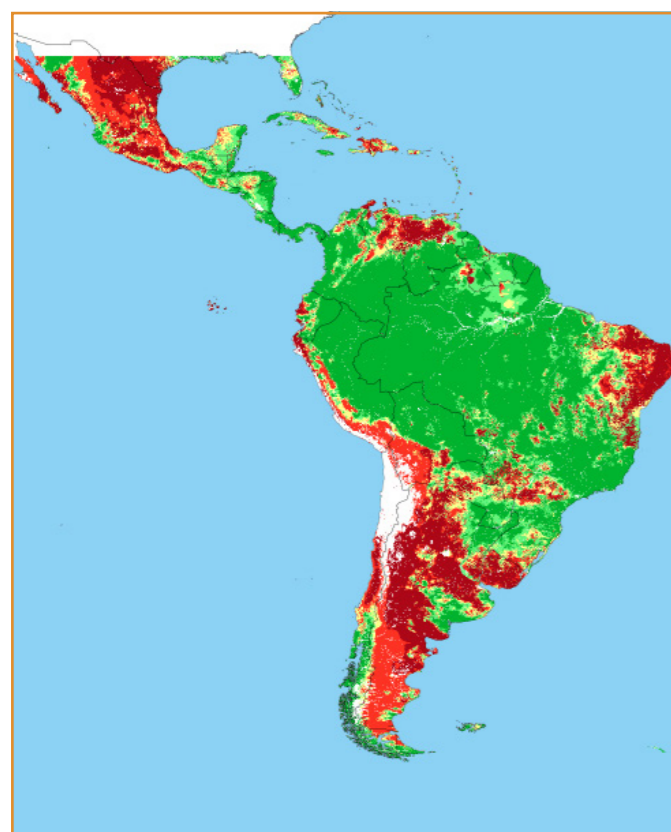
segunda-feira, 7 de dezembro



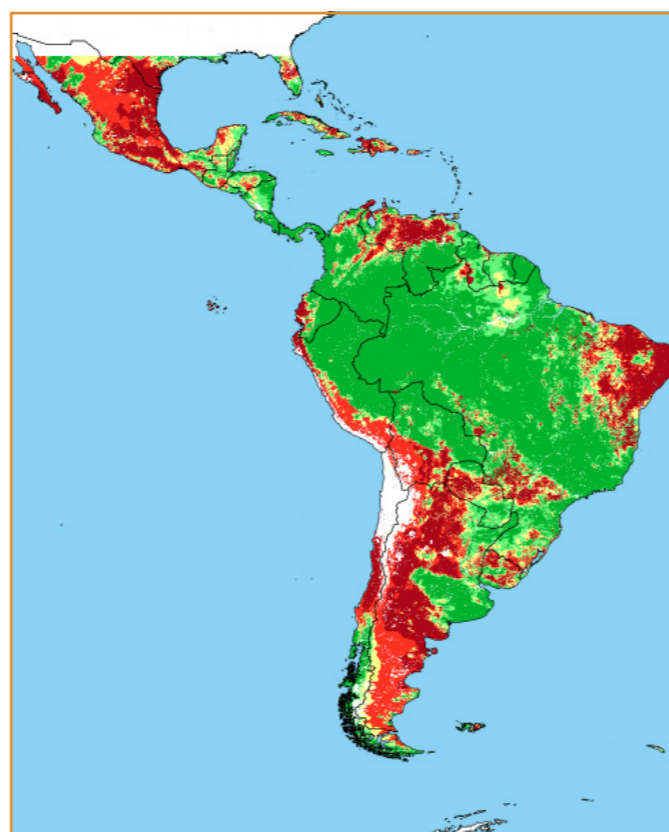
terça-feira, 8 de dezembro



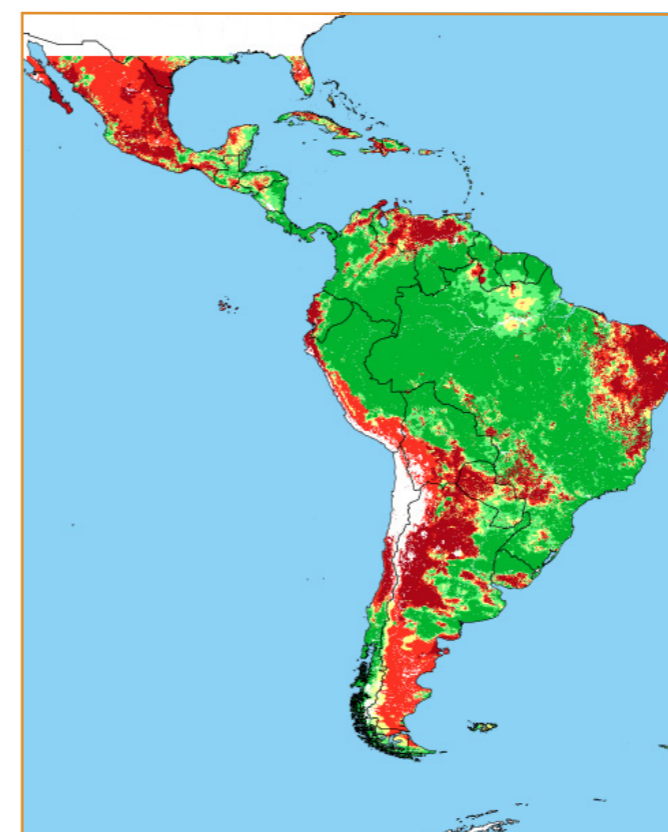
quarta-feira, 9 de dezembro



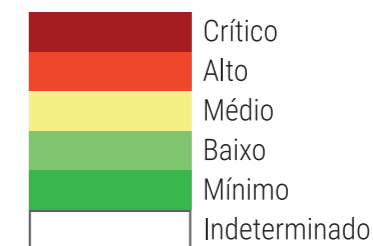
quinta-feira, 10 de dezembro



sexta-feira, 11 de dezembro



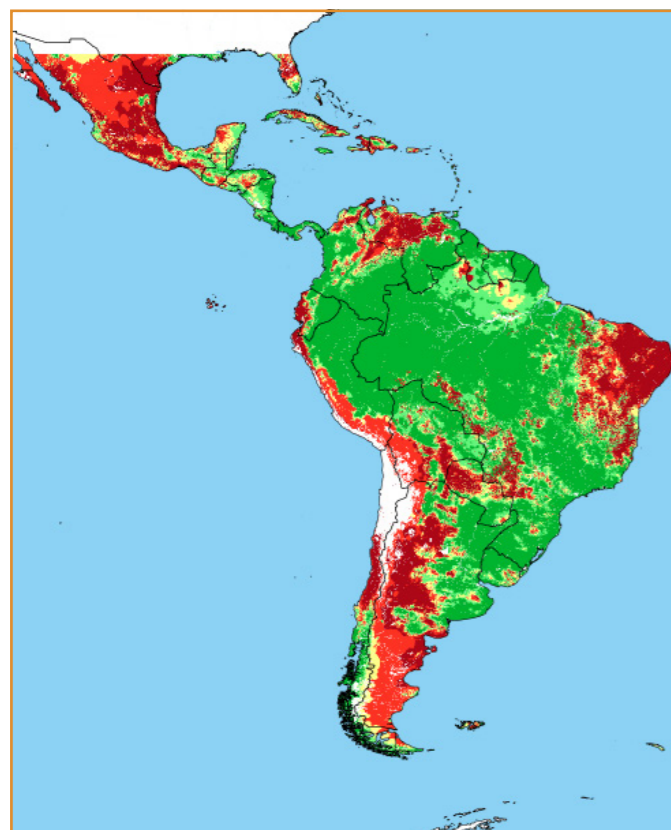
sábado, 12 de dezembro



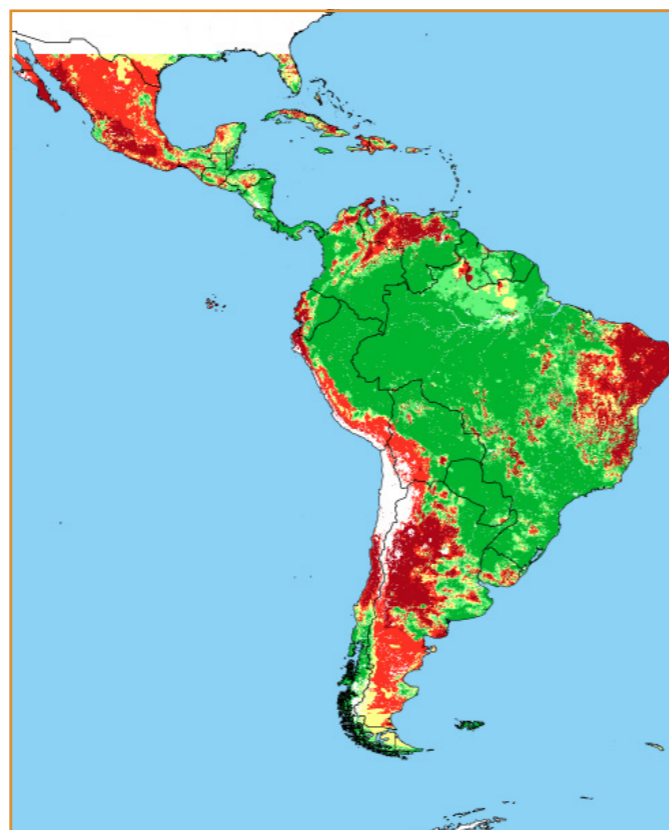
DEZEMBRO / 2020						
D	S	T	Q	Q	S	S
		336	337	338	339	340
341	342	343	344	345	346	347
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362	363	364	365	366		

CALENDÁRIO JULIANO

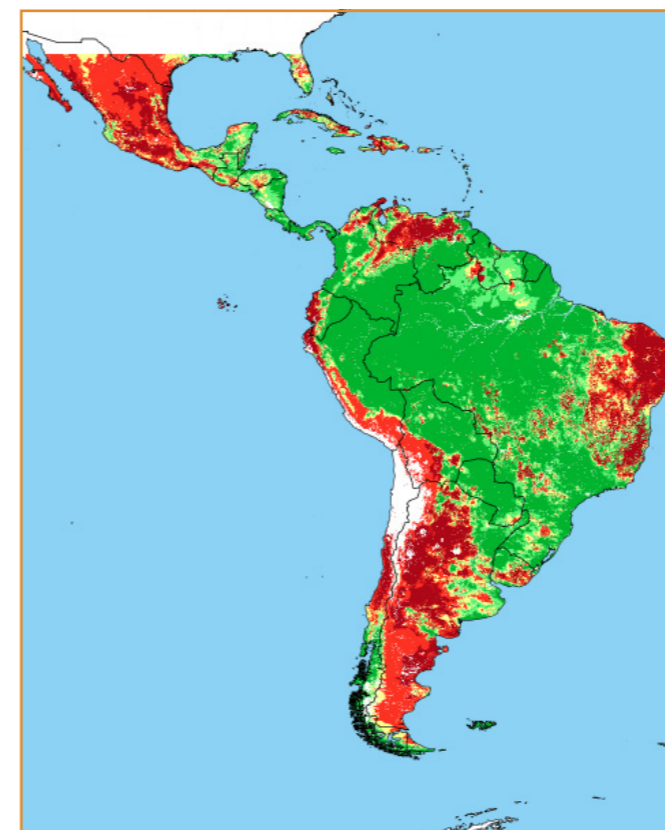




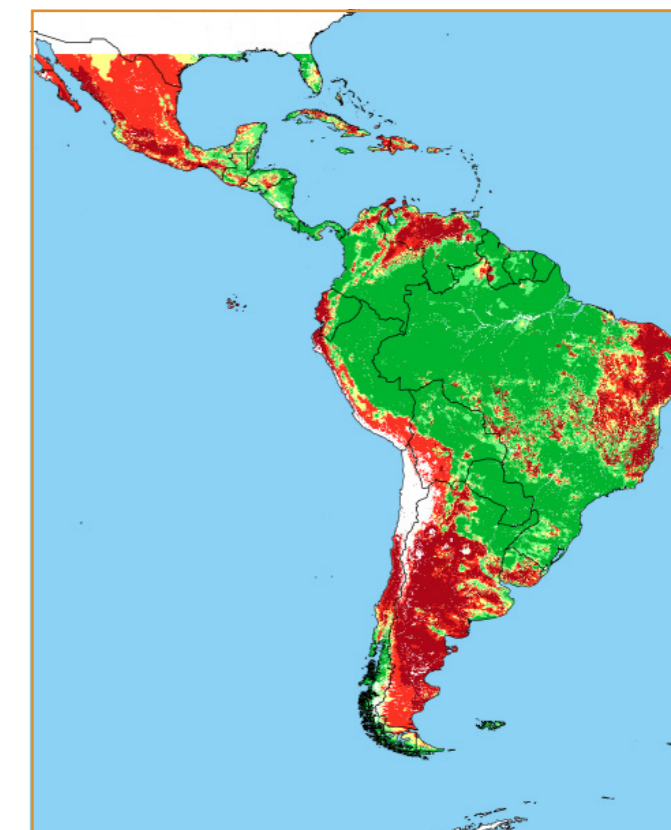
domingo, 13 de dezembro



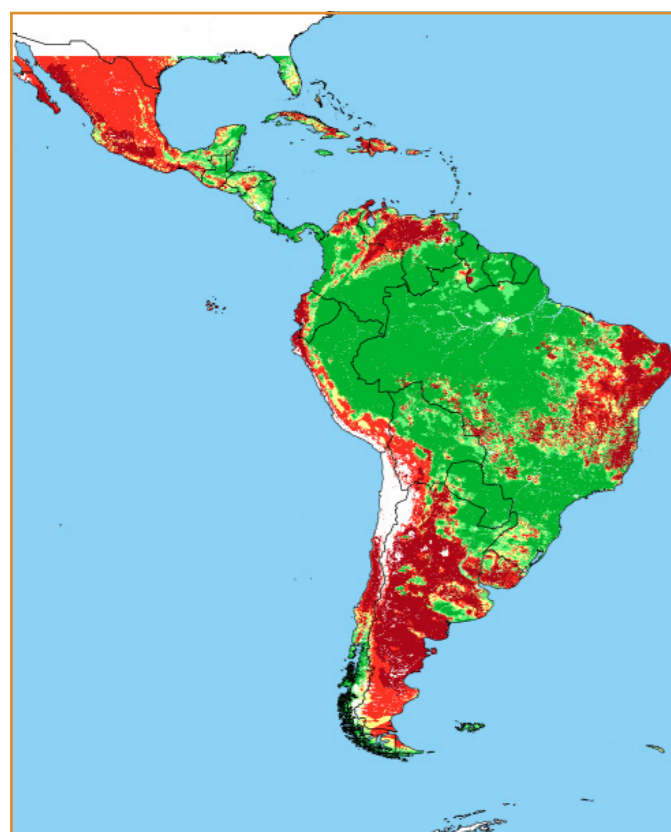
segunda-feira, 14 de dezembro



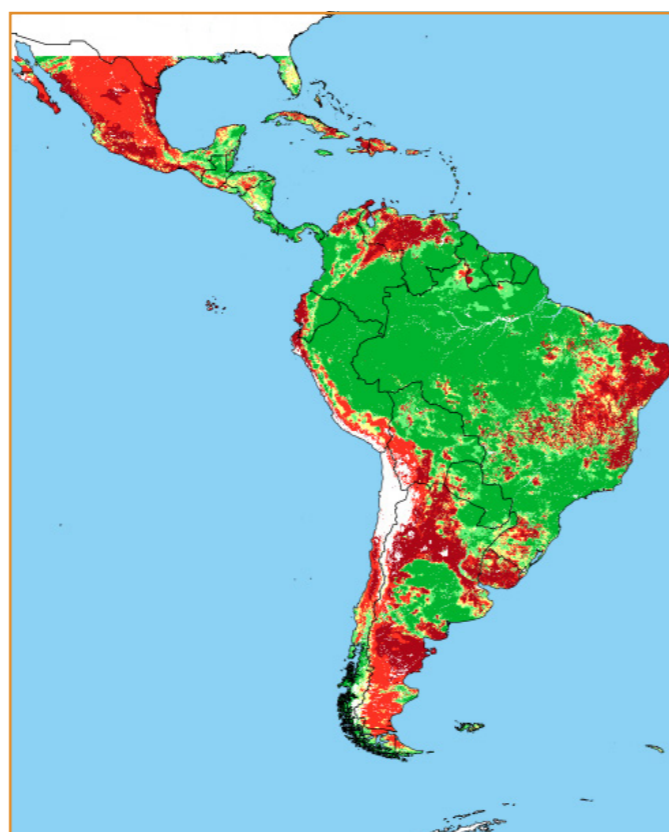
terça-feira, 15 de dezembro



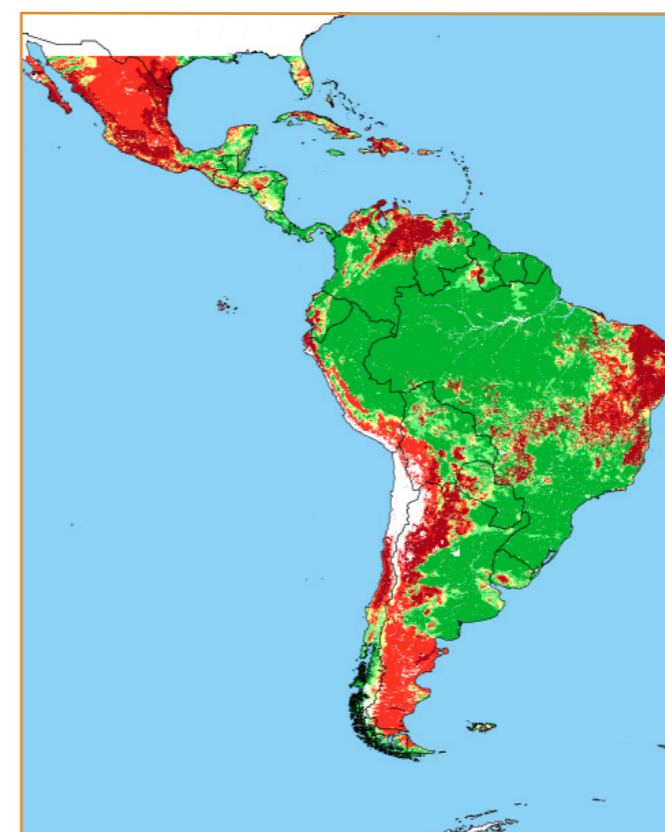
quarta-feira, 16 de dezembro



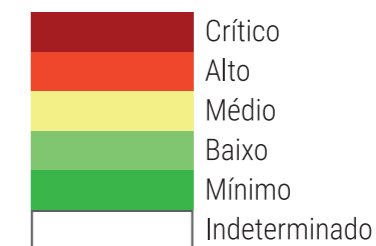
quinta-feira, 17 de dezembro



sexta-feira, 18 de dezembro



sábado, 19 de dezembro



DEZEMBRO / 2020						
D	S	T	Q	Q	S	S
		336	337	338	339	340
341	342	343	344	345	346	347
348	349	350	351	352	353	354
355	356	357	358	359	360	361
362	363	364	365	366		

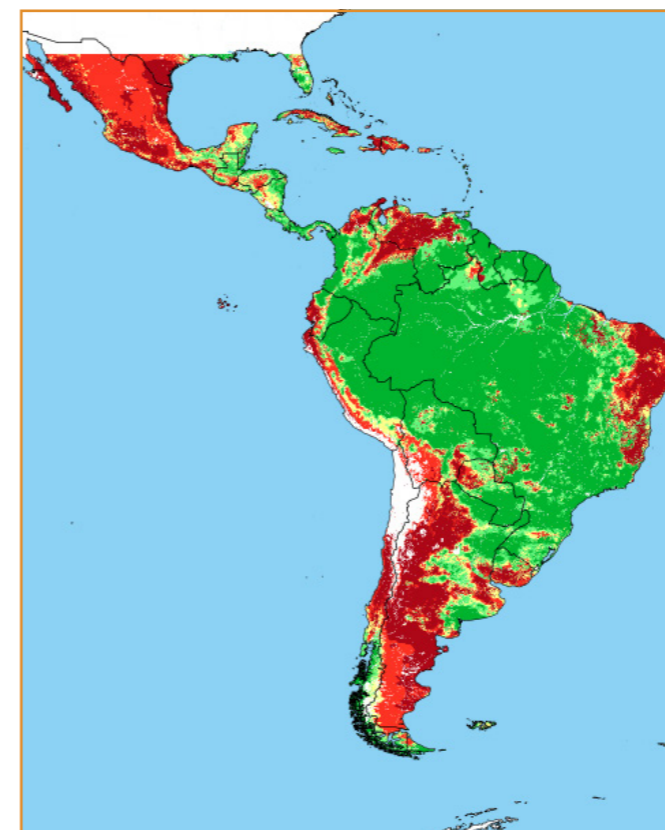
CALENDÁRIO JULIANO



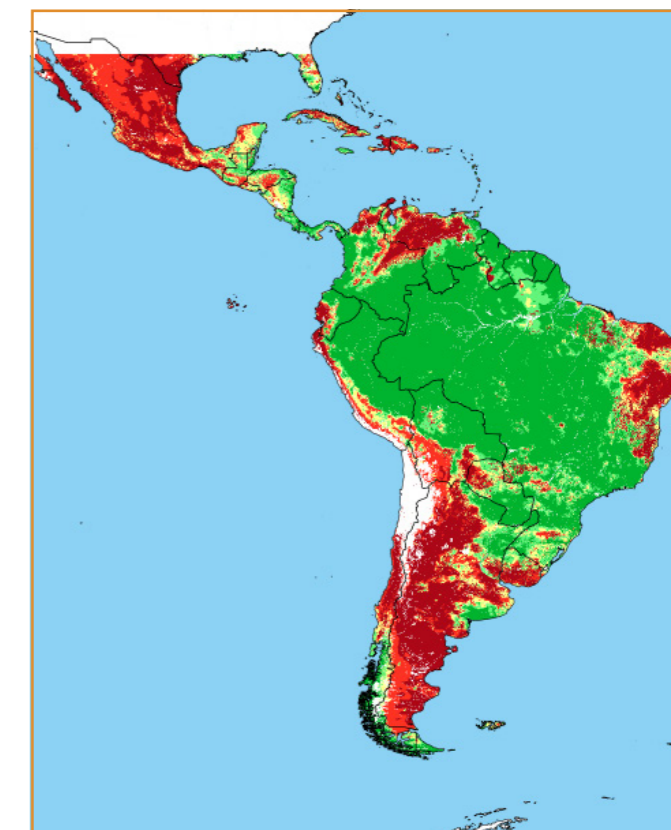
domingo, 20 de dezembro



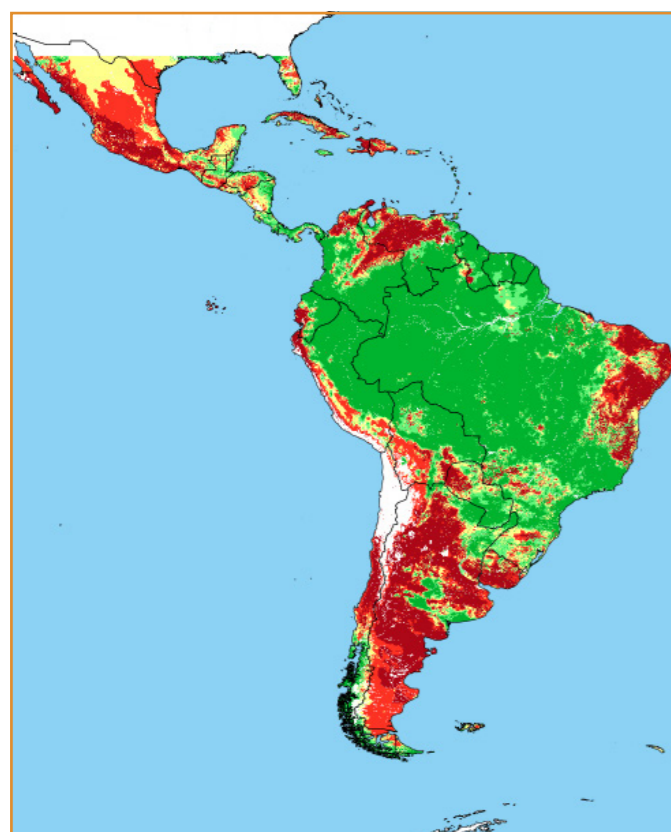
segunda-feira, 21 de dezembro



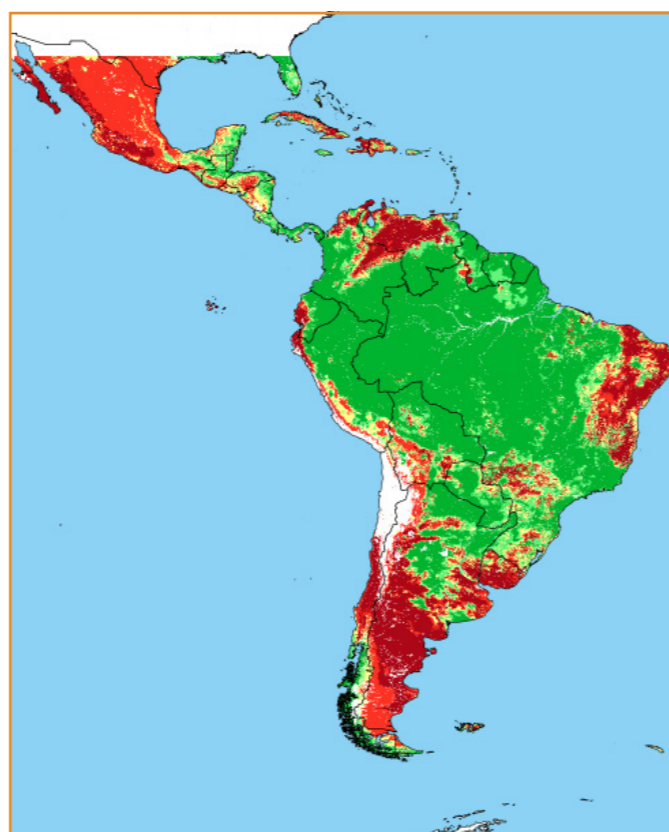
terça-feira, 22 de dezembro



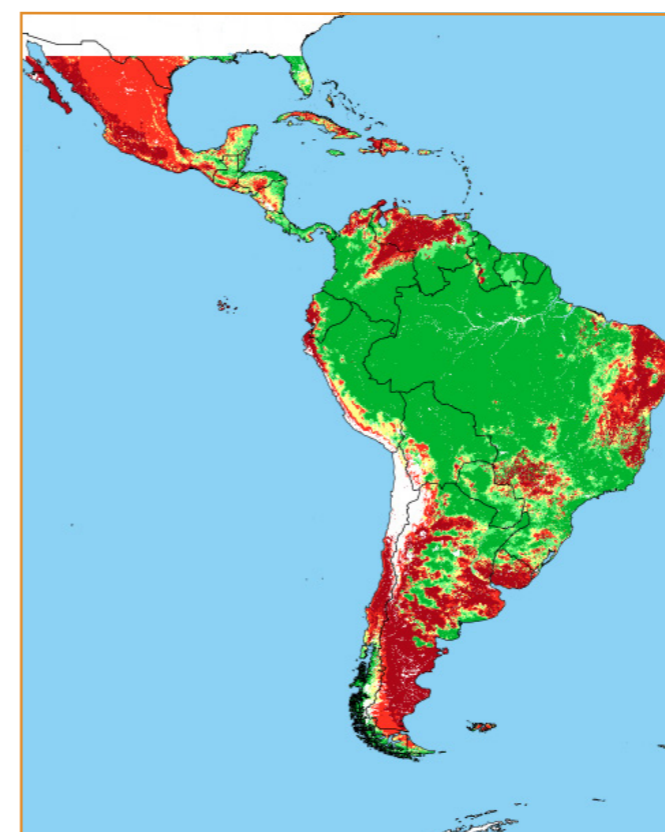
quarta-feira, 23 de dezembro



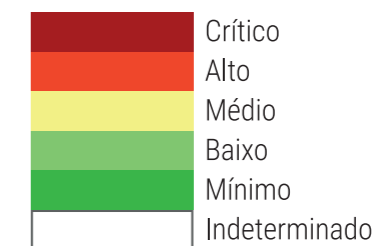
quinta-feira, 24 de dezembro



sexta-feira, 25 de dezembro

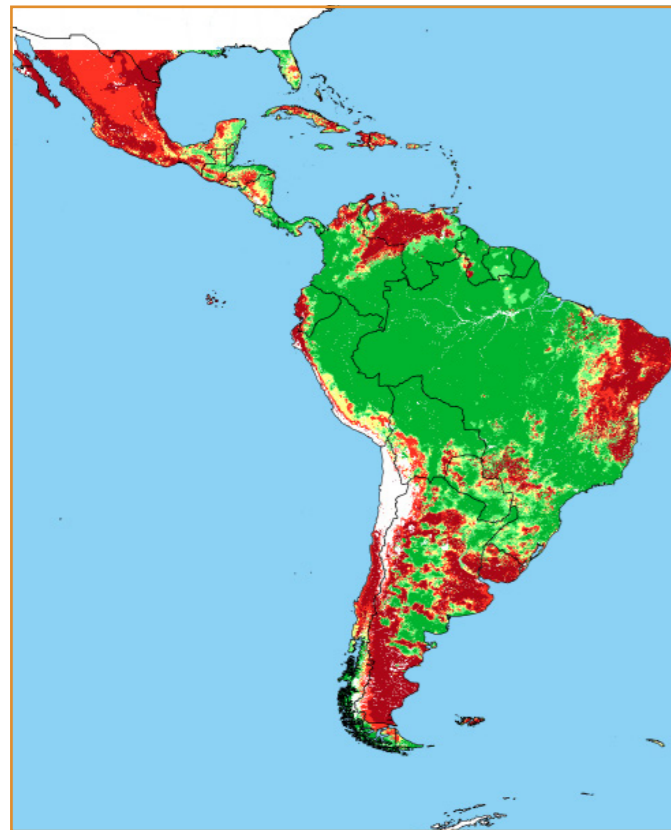


sábado, 26 de dezembro

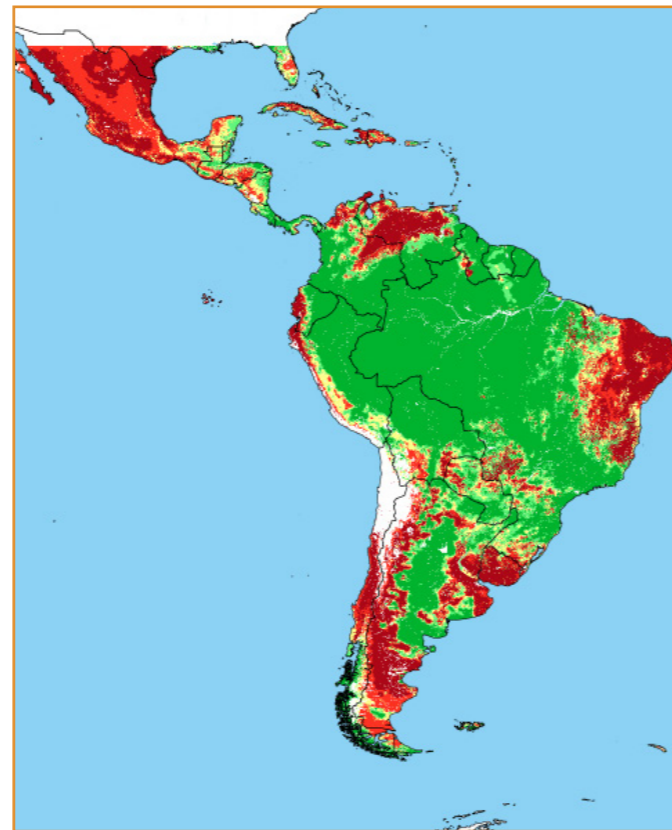


DEZEMBRO / 2020						
<b>D</b>	<b>S</b>	<b>T</b>	<b>Q</b>	<b>Q</b>	<b>S</b>	<b>S</b>
		336	337	338	339	340
341	342	343	344	345	346	347
348	349	350	351	352	353	354
355	356	357	358	359	360	361
362	363	364	365	366		

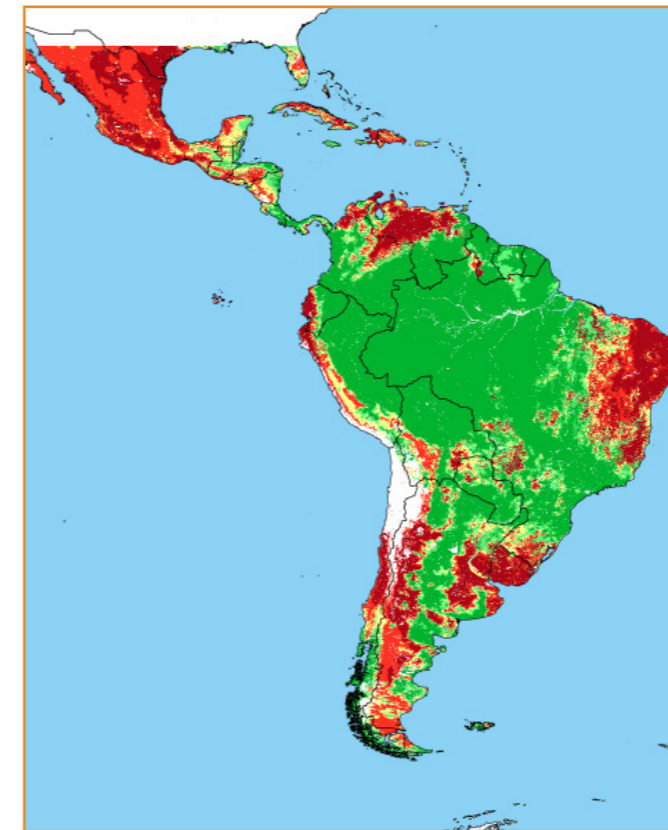
CALENDÁRIO JULIANO



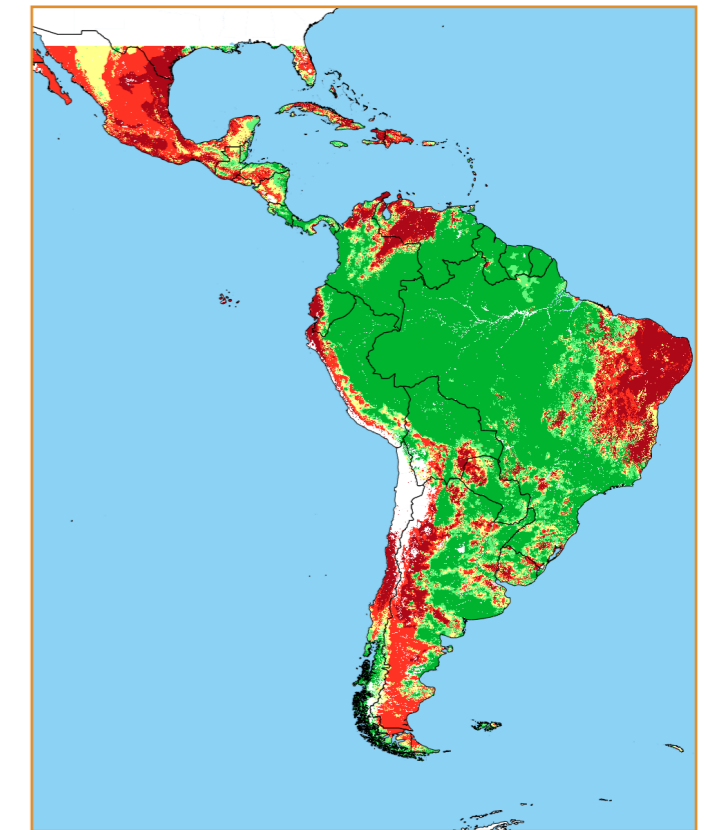
domingo, 27 de dezembro



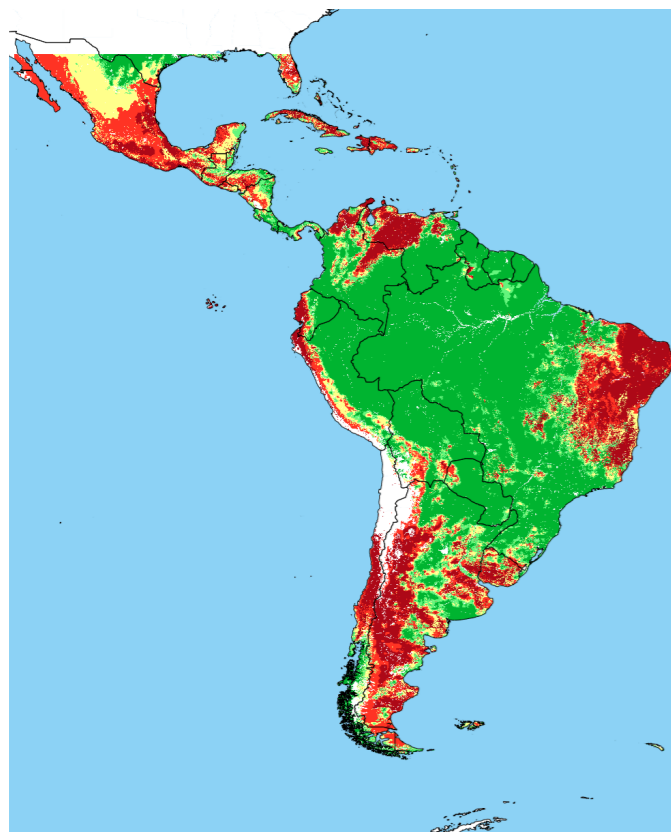
segunda-feira, 28 de dezembro



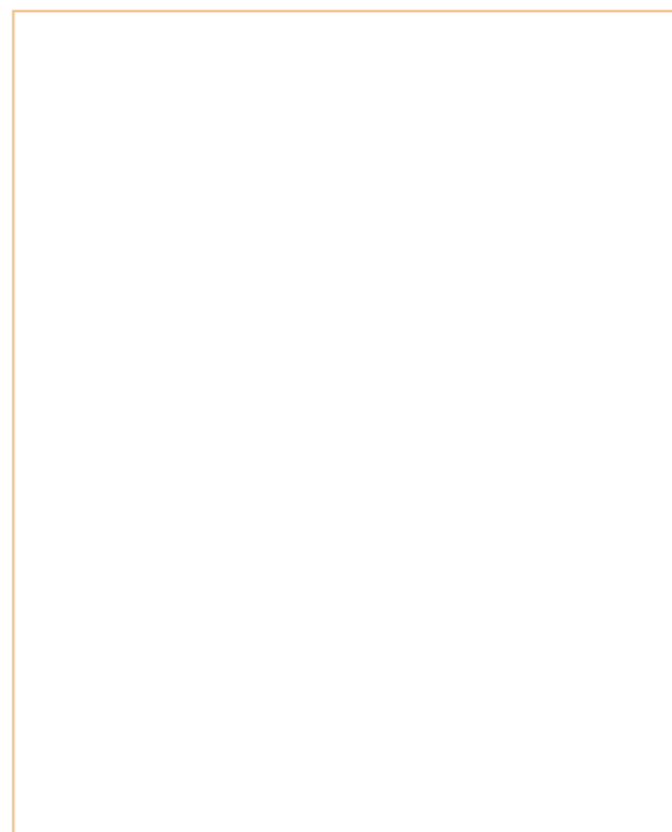
terça-feira, 29 de dezembro



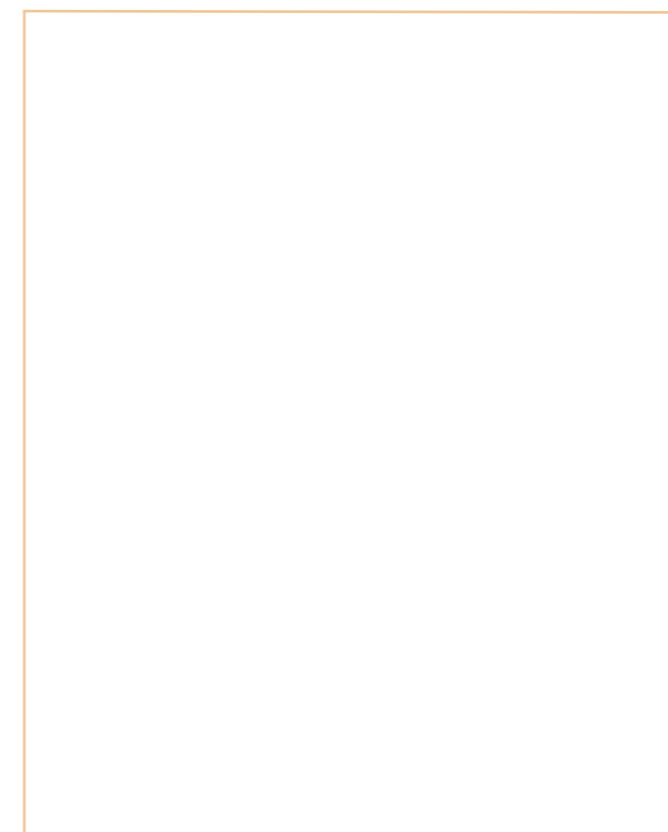
quarta-feira, 30 de dezembro



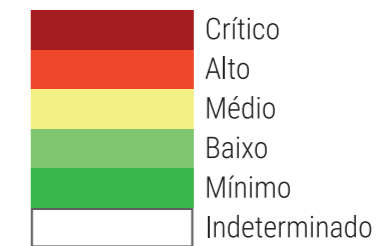
quinta-feira, 31 de dezembro



sexta-feira, 1 de janeiro



sábado, 2 de janeiro



DEZEMBRO / 2020						
D	S	T	Q	Q	S	S
		336	337	338	339	340
341	342	343	344	345	346	347
348	349	350	351	352	353	354
355	356	357	358	359	360	361
362	363	364	365	366		

CALENDÁRIO JULIANO

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SETZER, A.; PEREIRA, M. C.; PEREIRA, J. R. O uso de satélites NOAA na detecção de queimadas no Brasil. Climanálise, v. 7, n. 8, p. 40-53, 1992.

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VILA, D.; GONCALVES, L.; TOLL, D.; ROZANTE, J. Statistical evaluation of combined daily gauge observations and rainfall satellite estimations over continental South America. Journal of Hydrometeorology, v. 10, n. 2, p. 533-543, 2008.

