Latitude/Longitude

Section 2

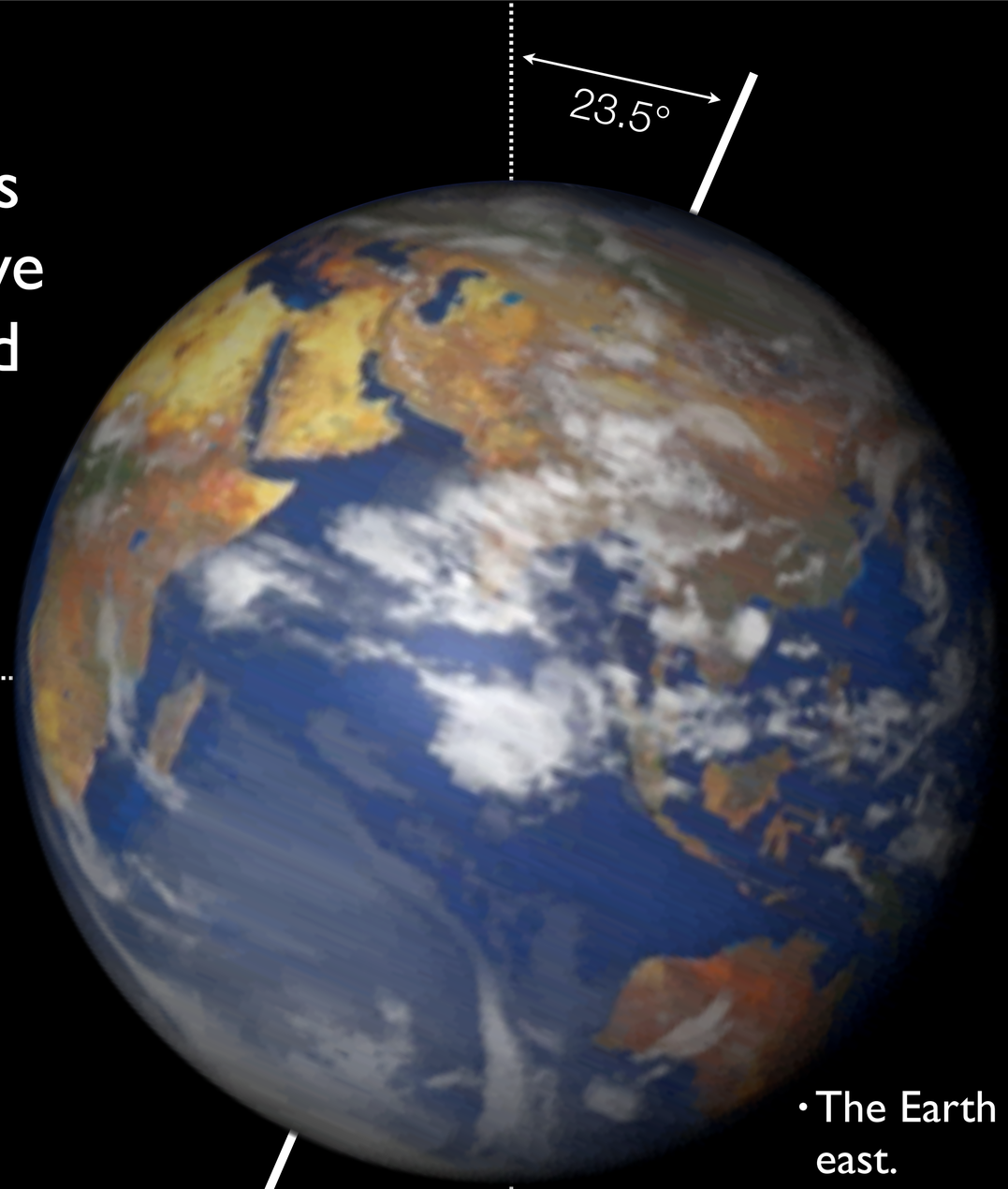
Rotation

Rotates on an Axis-Gives us Day and Night-Once every 24 Hours-15° per Hour

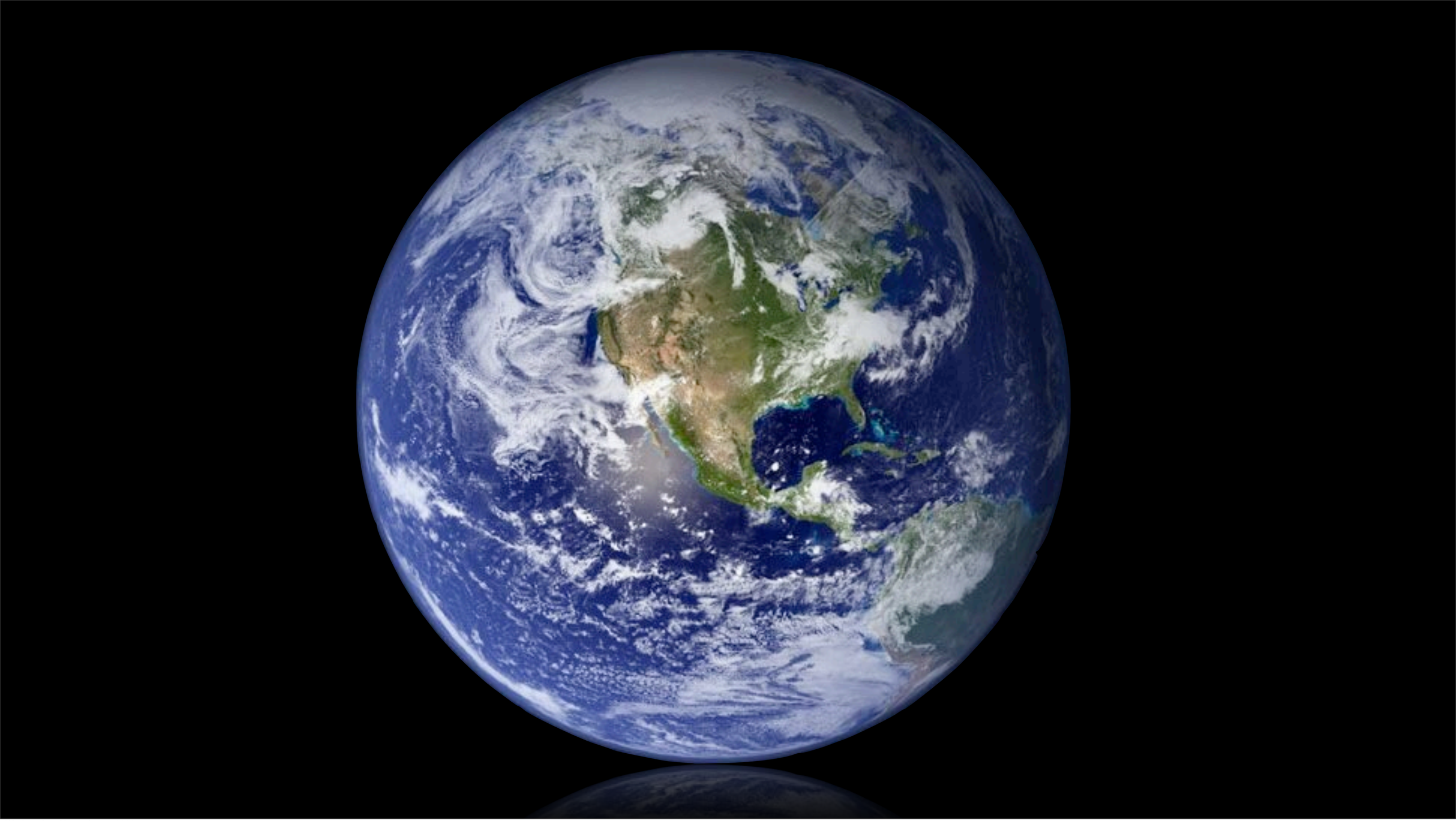
Revolution

Trip Around The Sun-Gives us our Seasons (Months of the year)-Once every 365 Days-1° per Day

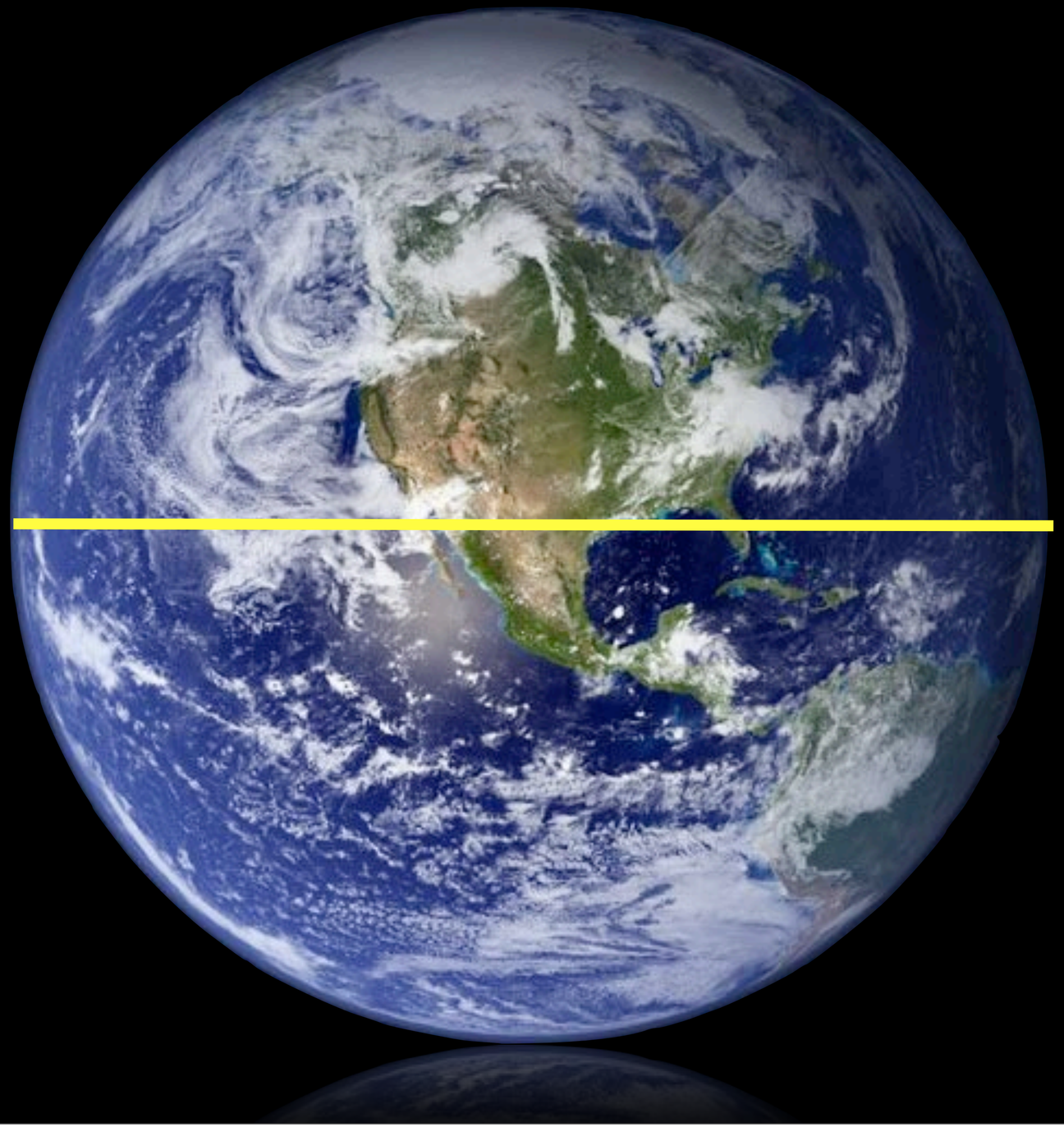
The Earth's axis is tilited 23.5° relative to its path around the Sun



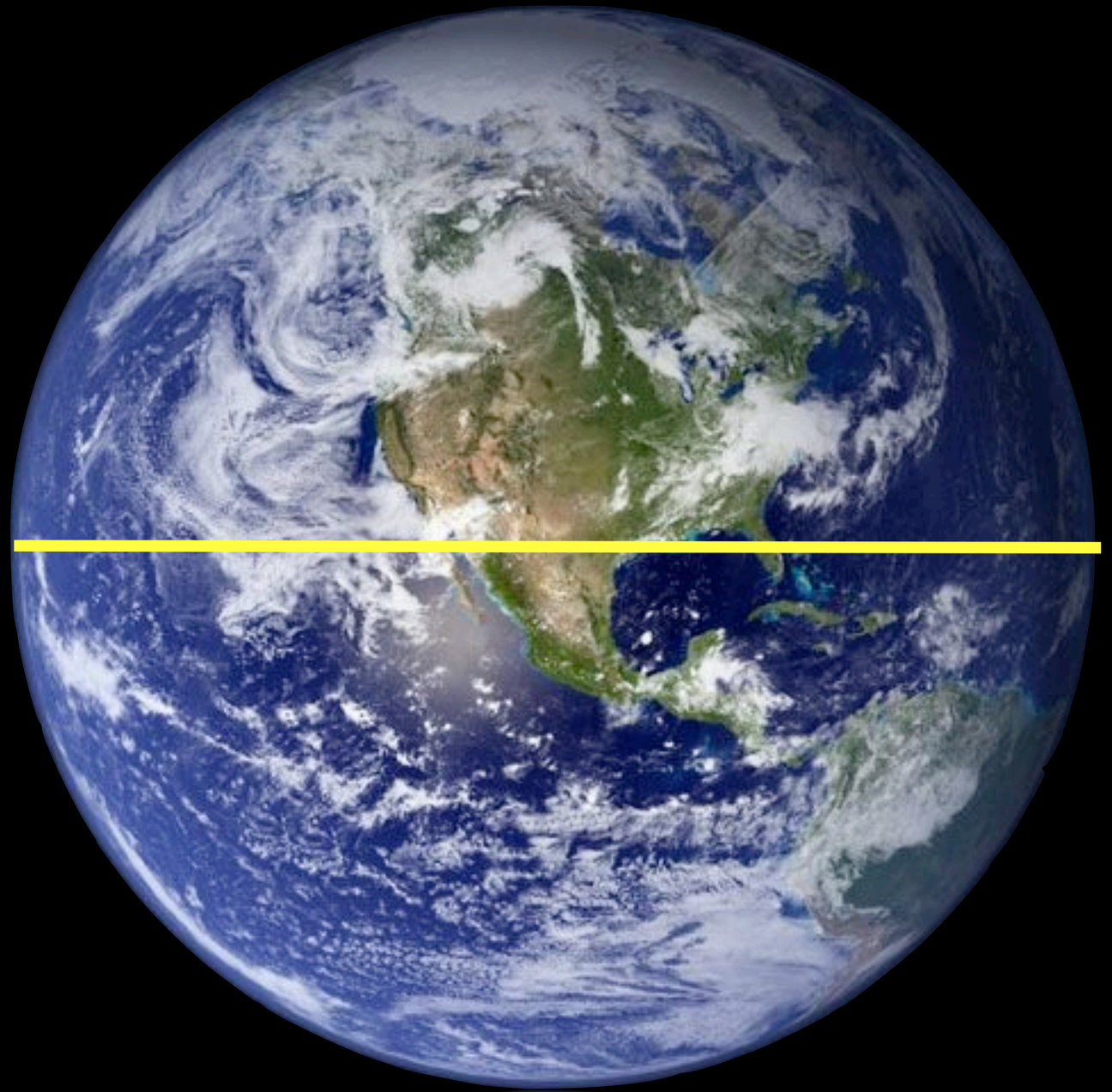
- The Earth is rotating on its axis from west to east.
- We make one complete rotation each day.
- This means we spin 15° each hour (360°/24)



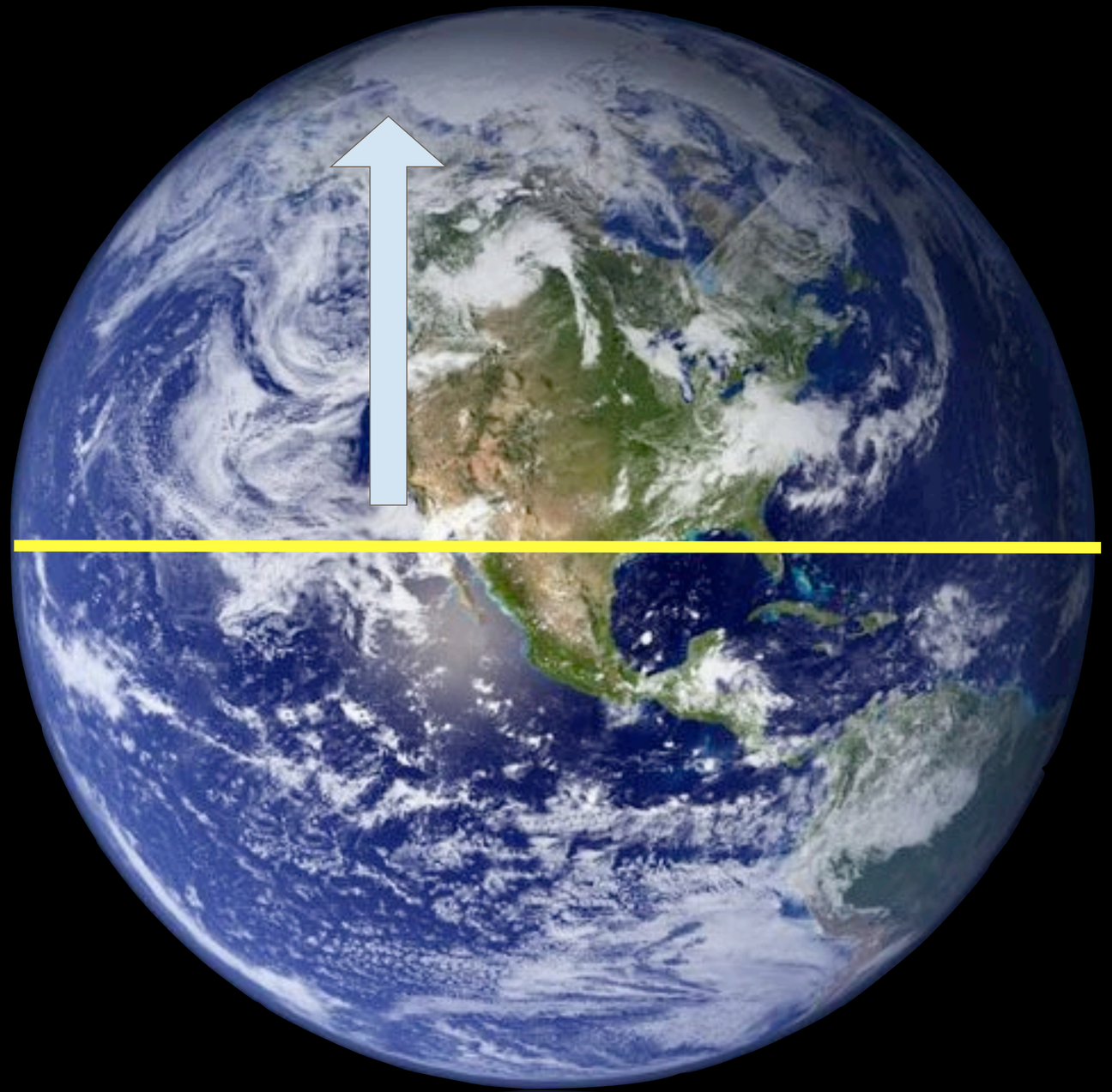
Wednesday, November 4, 2009



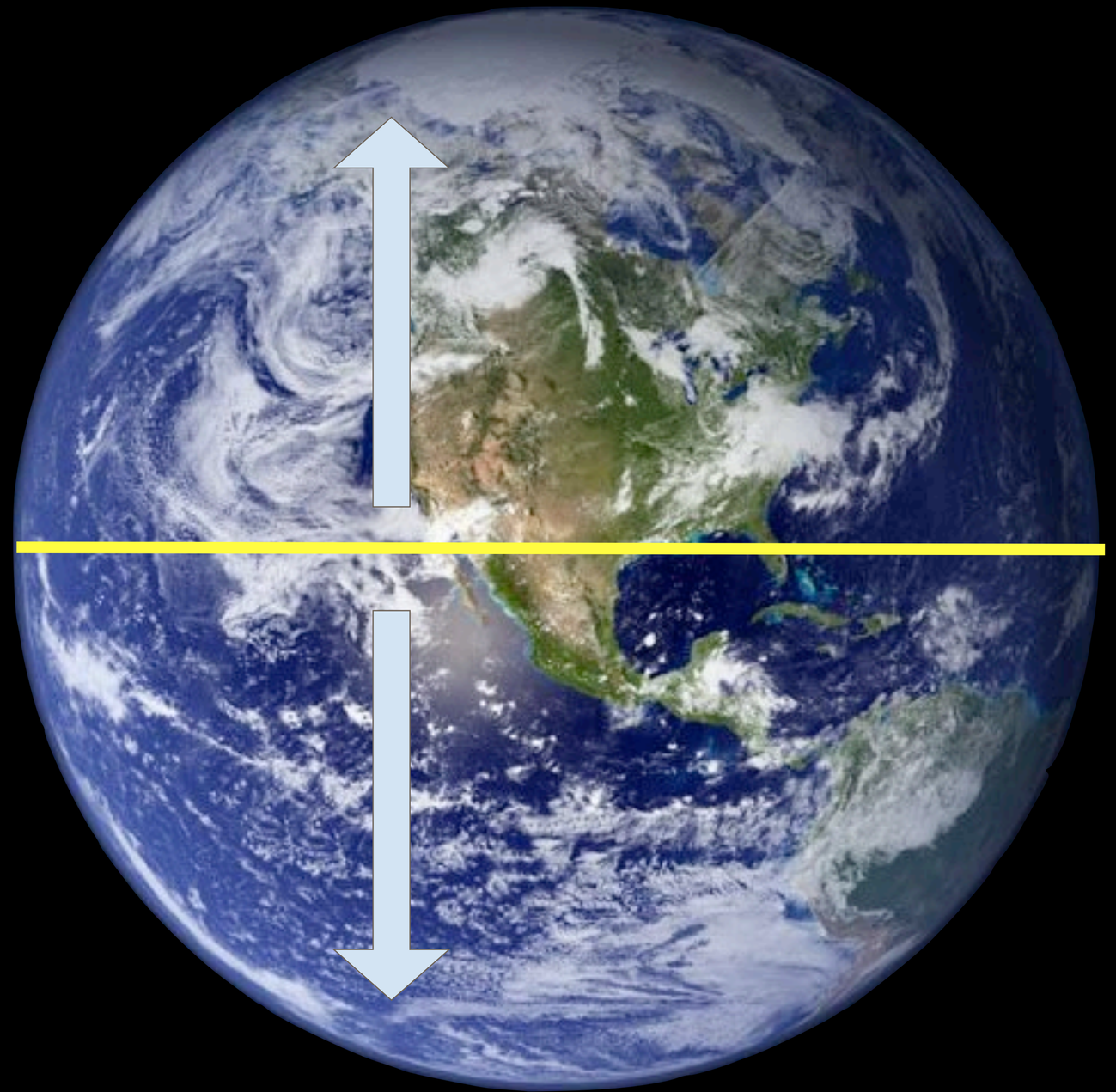
Latitude



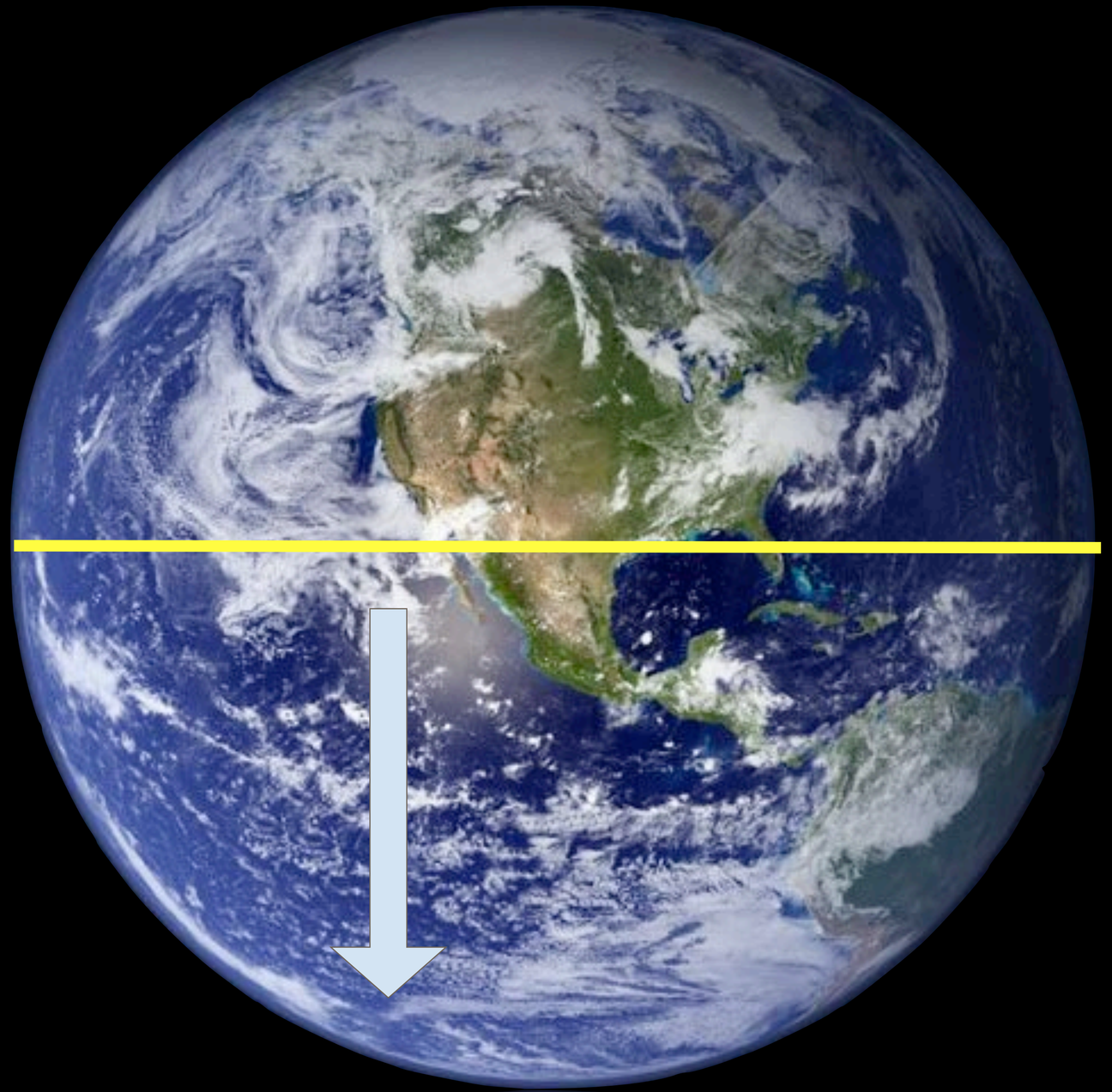
Latitude



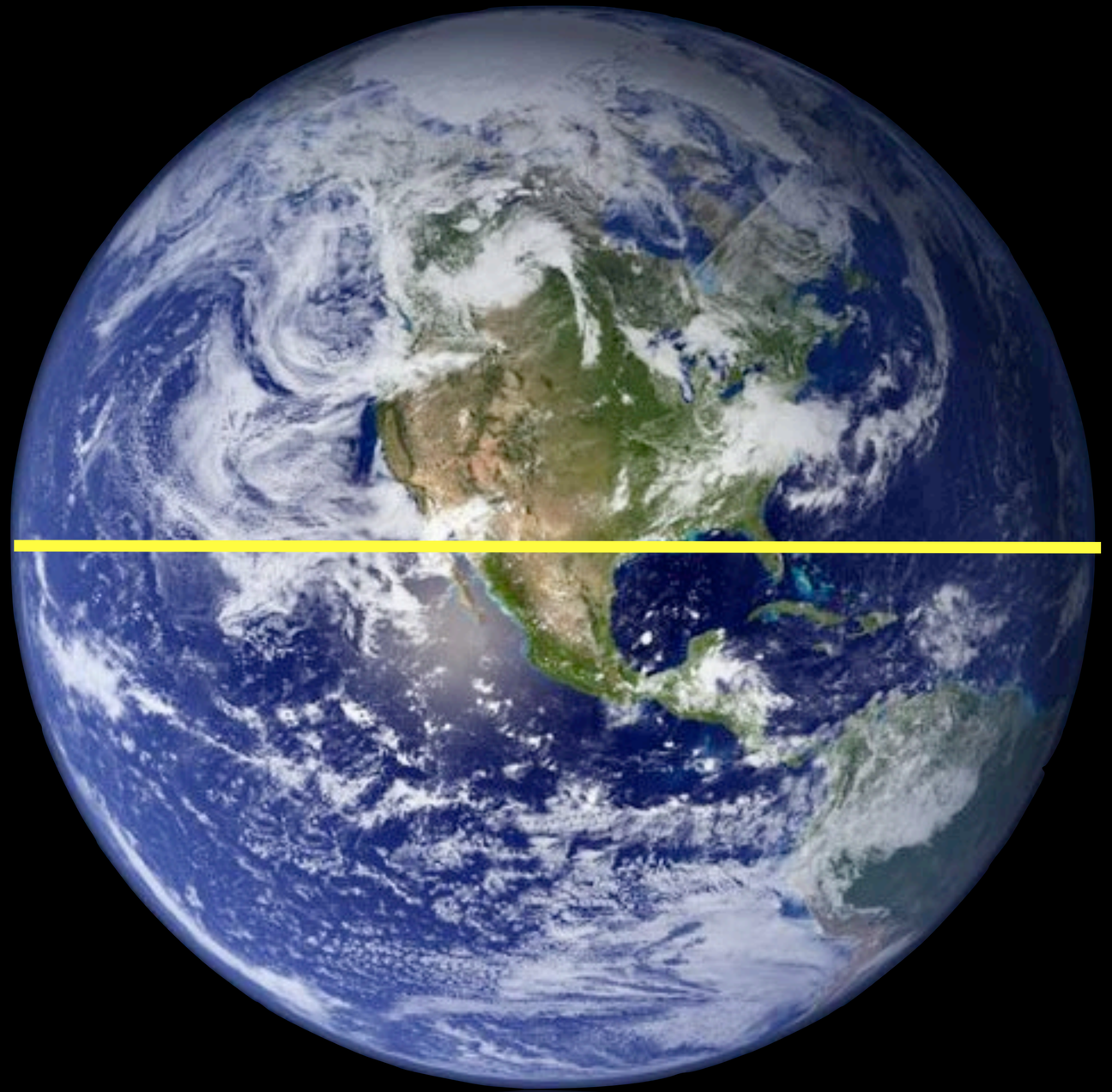
Latitude



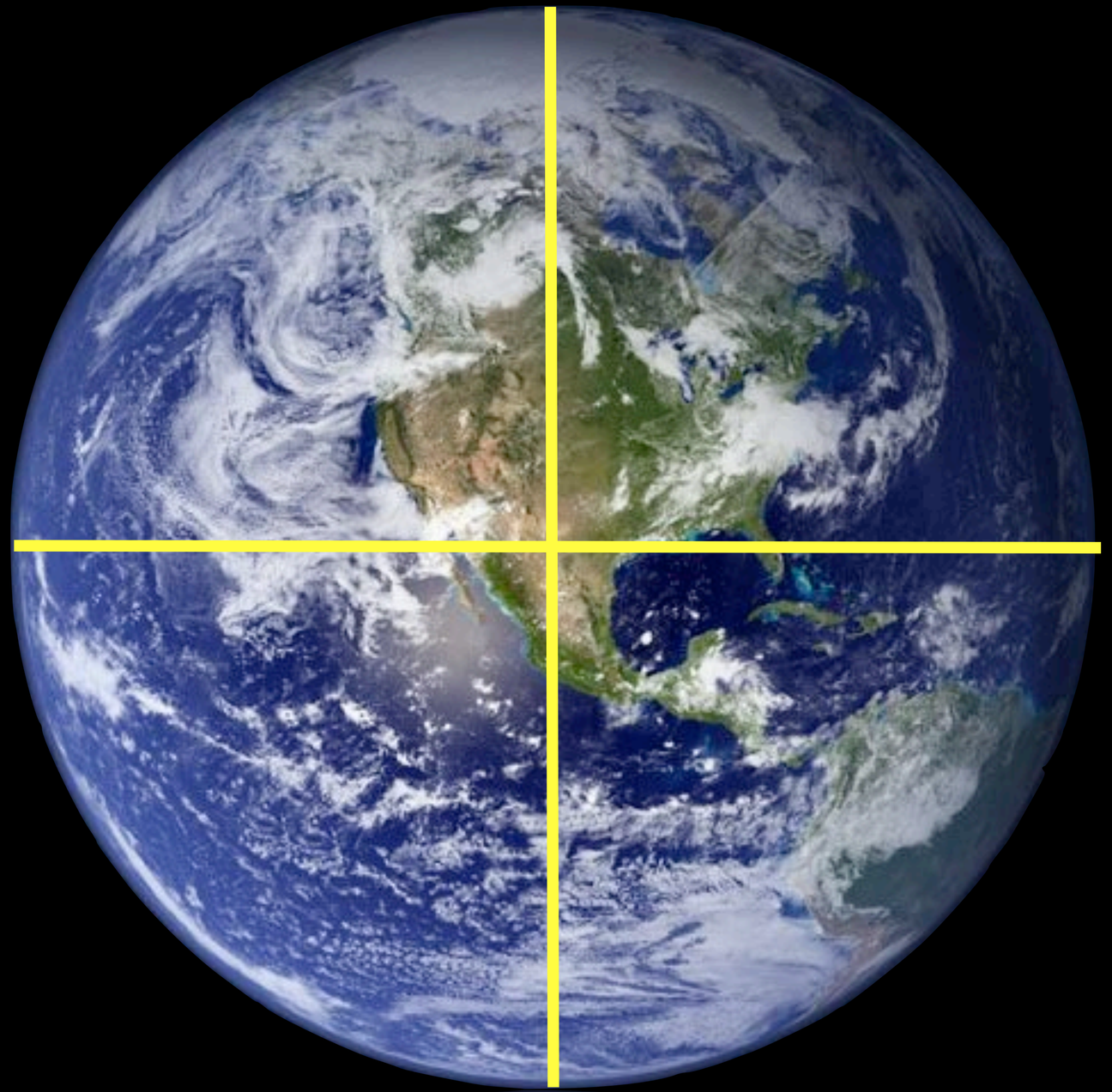
Latitude



Latitude

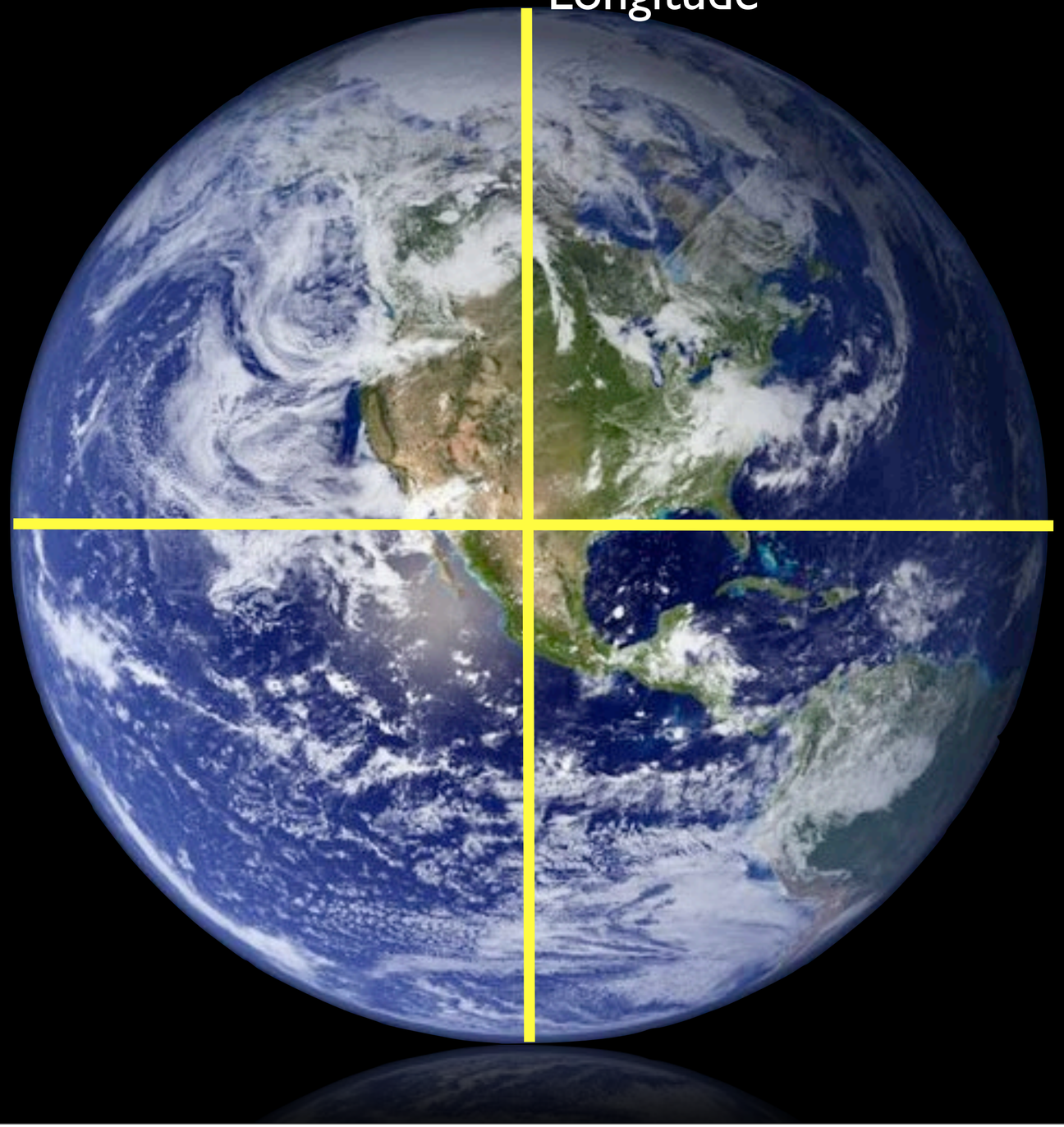


Latitude



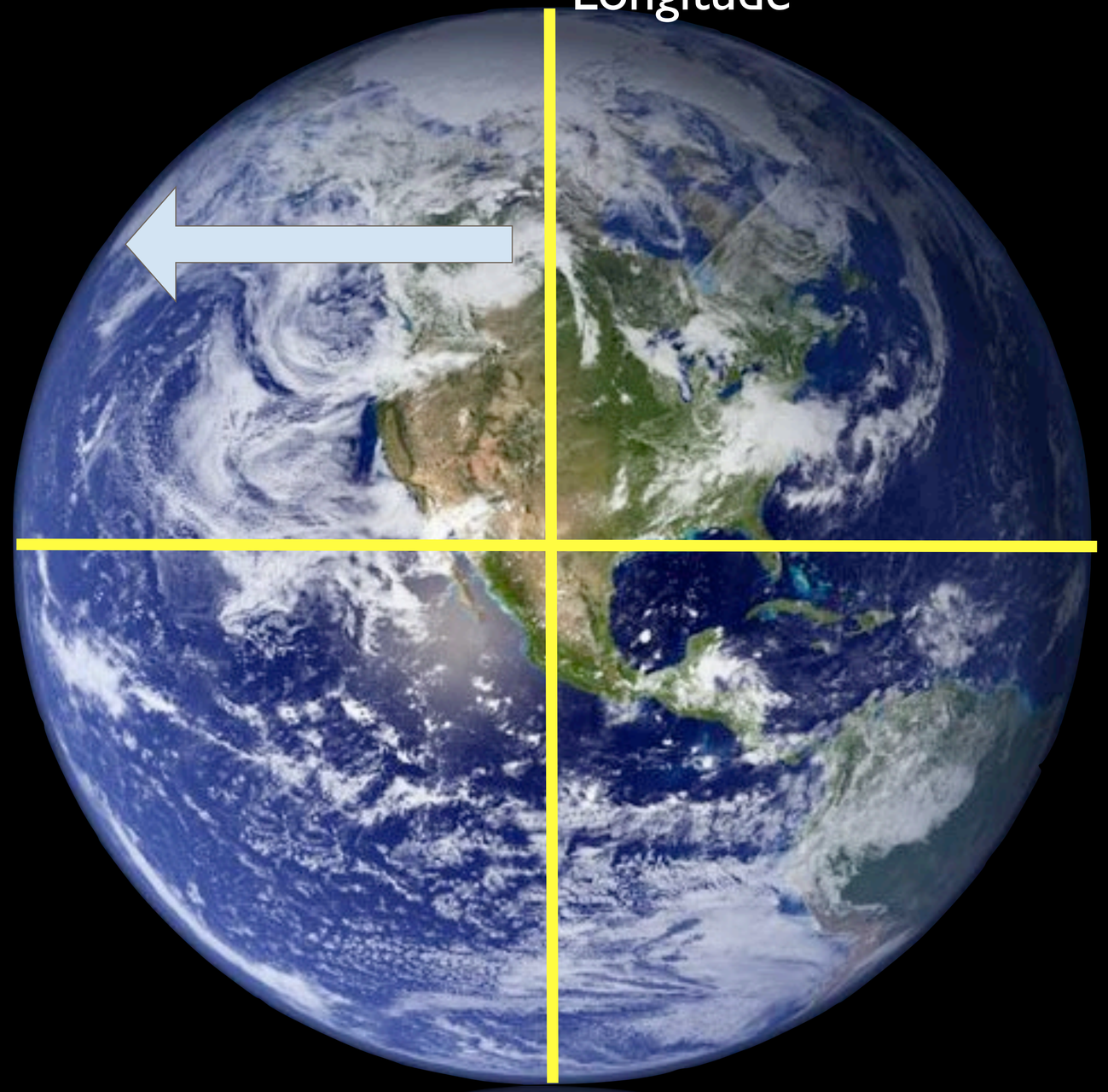
Longitude

Latitude



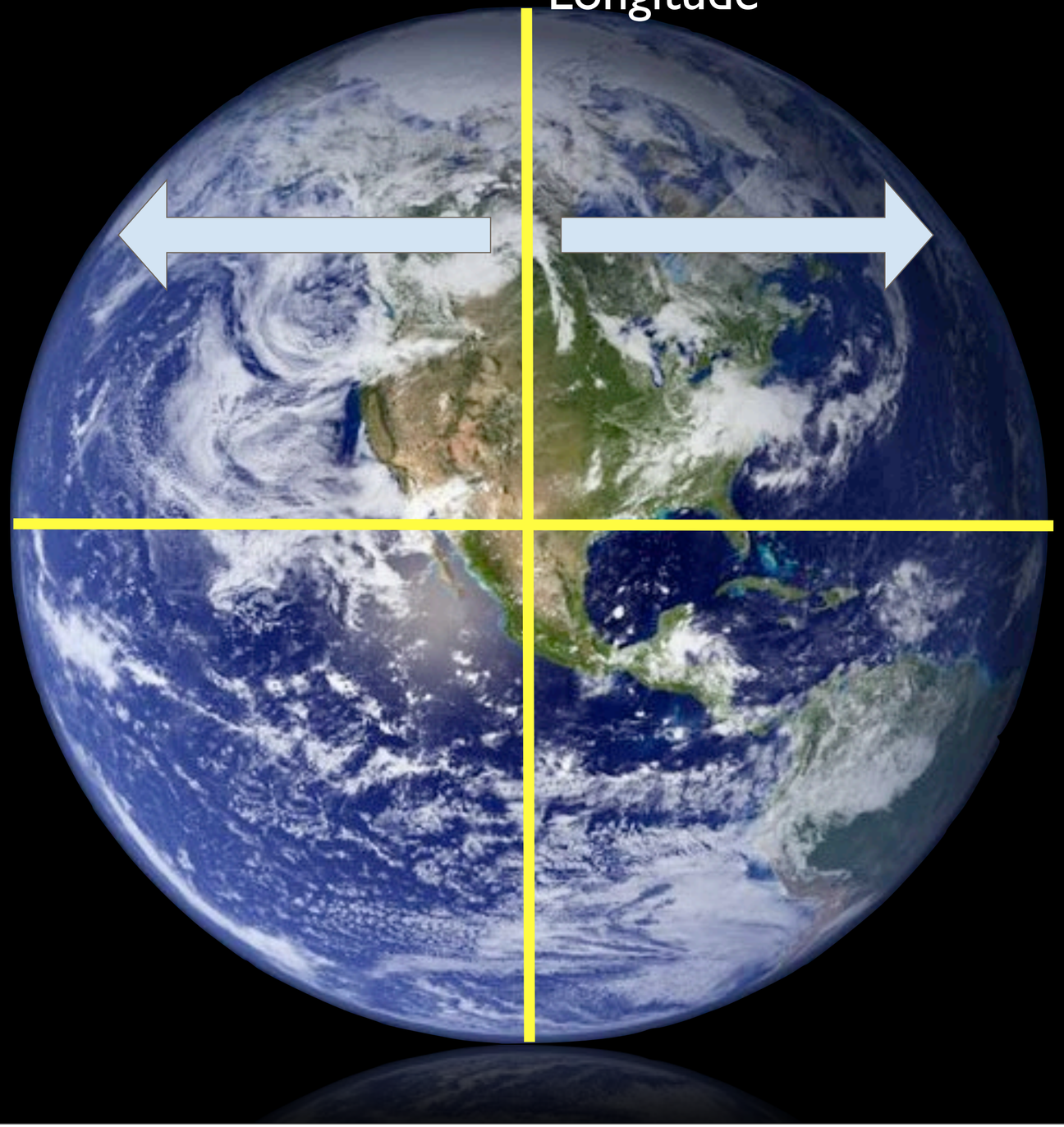
Longitude

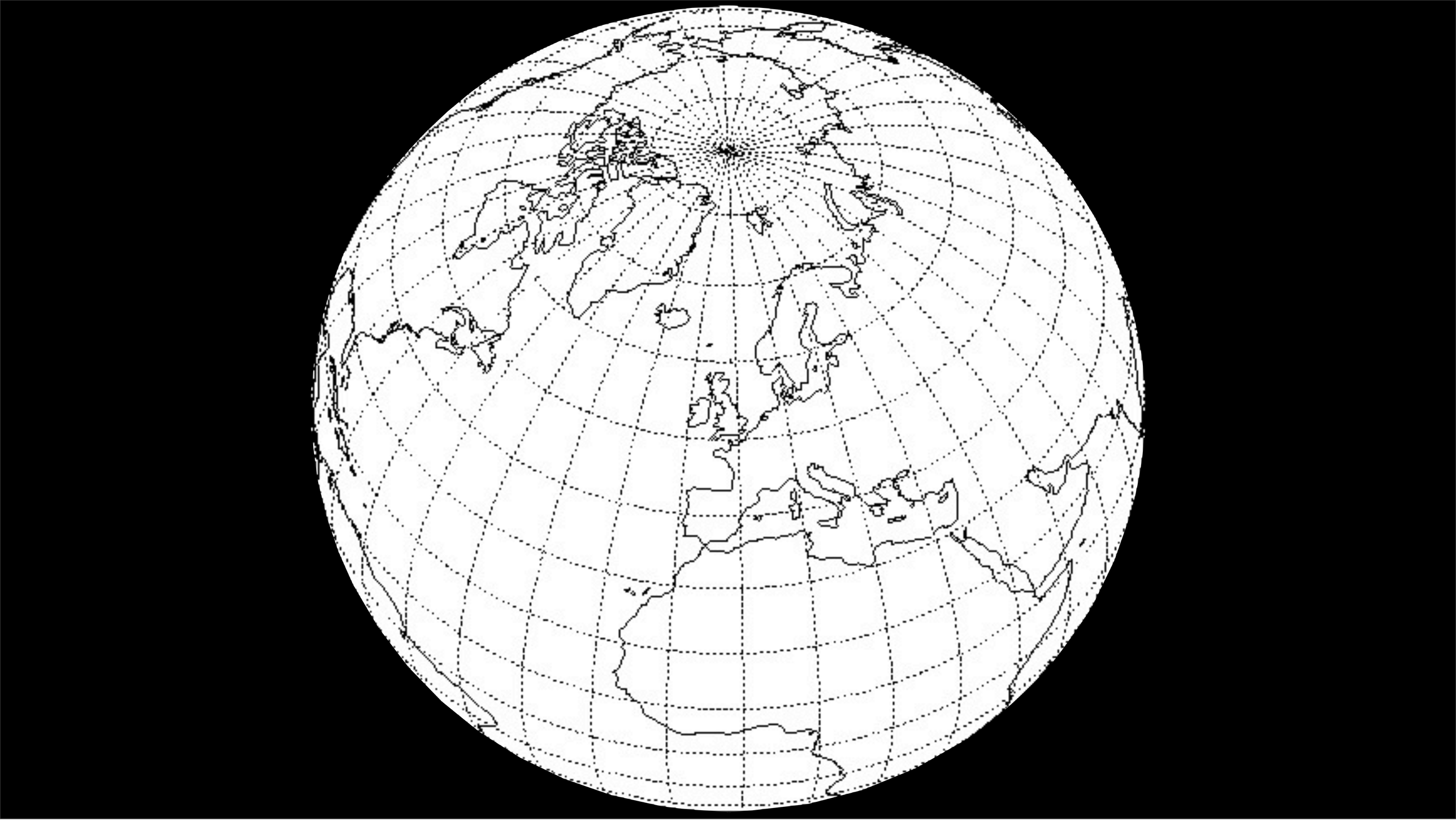
Latitude



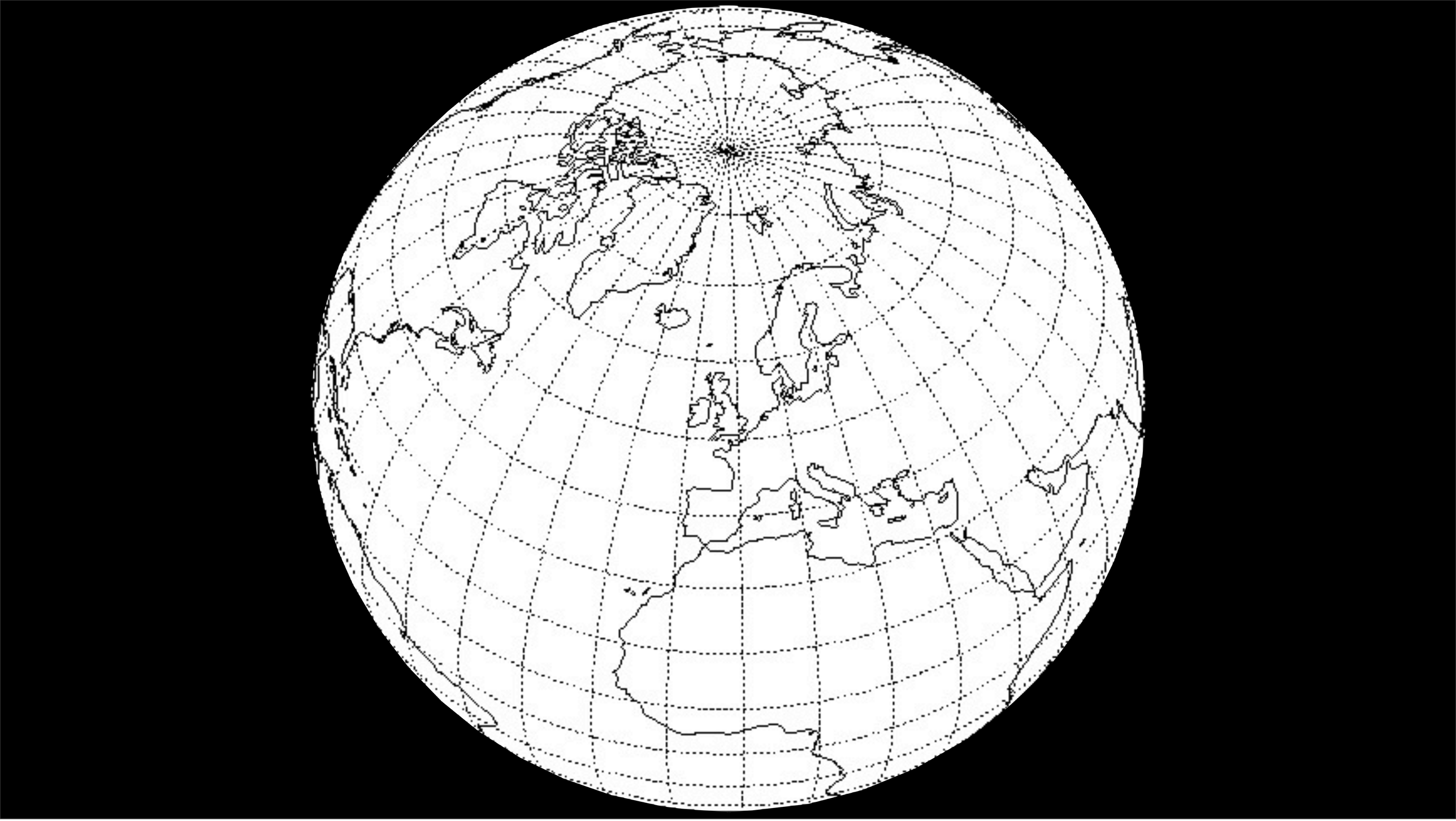
Longitude

Latitude

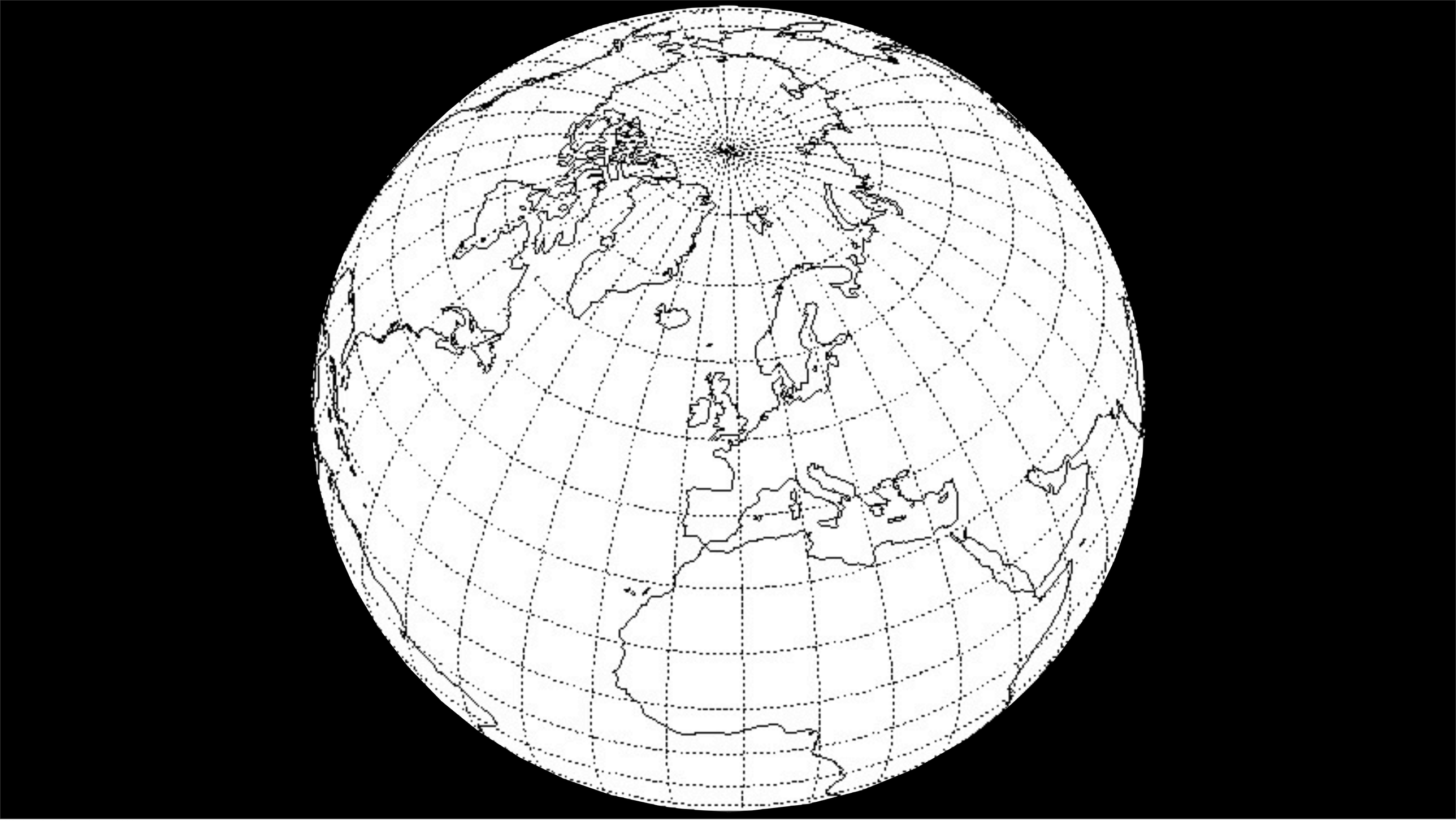




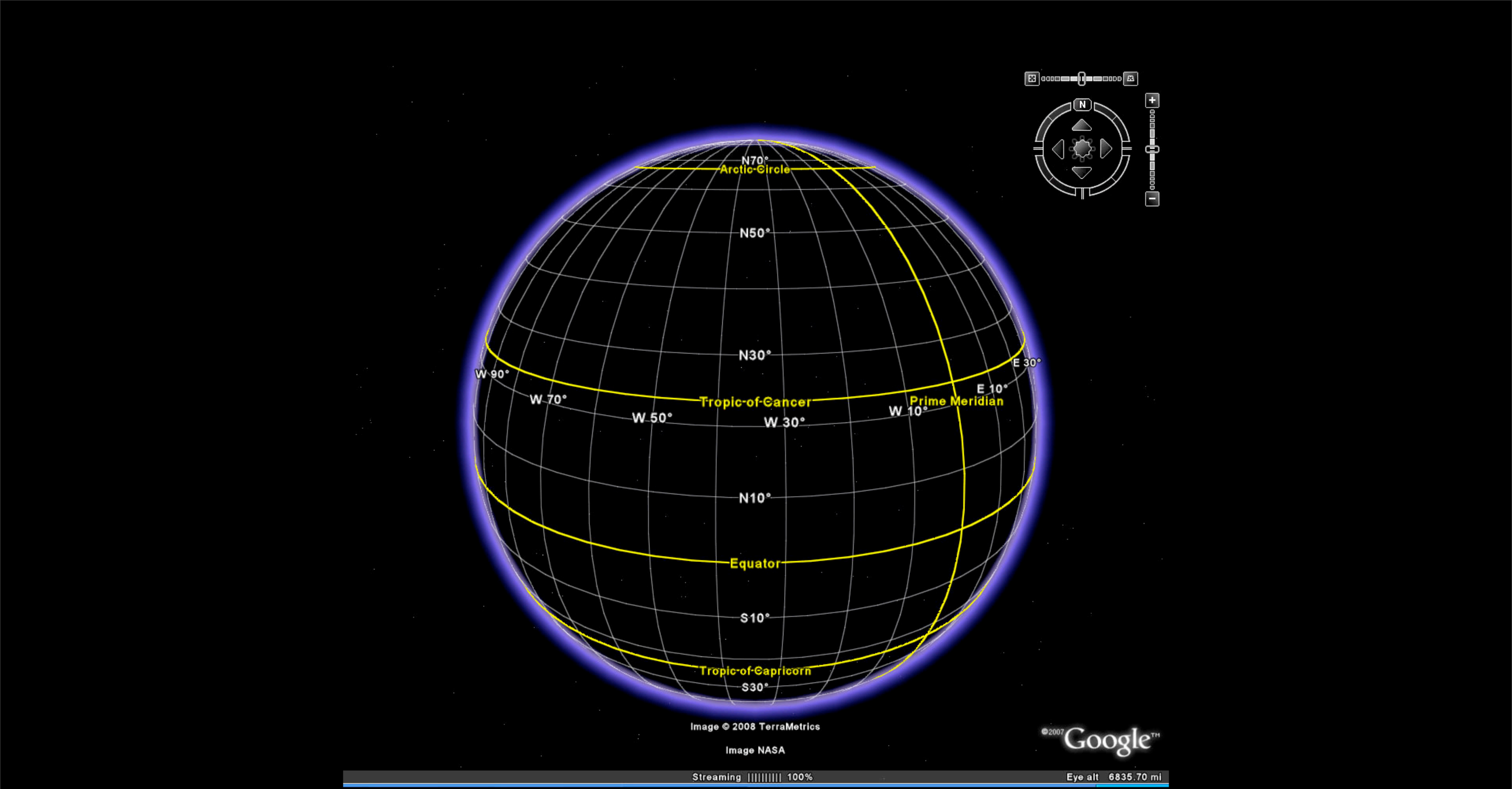
Wednesday, November 4, 2009



Wednesday, November 4, 2009



Wednesday, November 4, 2009


N70°
Arctic Circle
N50°
N30°
W 90°
W 70°
W 50°
W 30°
W 10°
E 10°
E 30°
Tropic of Cancer
Prime Meridian
N10°
Equator
S10°
Tropic of Capricorn
S30°
N
Image © 2008 TerraMetrics
Image NASA
©2007 Google™
Streaming |||||||||| 100%
Eye alt 6835.70 mi

Scale 1:134,000,000
Robinson Projection
standard parallels 38° N and 38° S

June 1998

Boundary representation is not necessarily authoritative.

802599 (R00352) 6-98

World Longitudes and Latitudes (cylindrical projection)

West Longitude

East Longitude

180° 170° 160° 150° 140° 130° 120° 110° 100° 90° 80° 70° 60° 50° 40° 30° 20° 10° 0° 10° 20° 30° 40° 50° 60° 70° 80° 90° 100° 110° 120° 130° 140° 150° 160° 170° 180°

80°N
70°N
60°N
50°N
40°N
30°N
20°N
10°N
0°
10°S
20°S
30°S
40°S
50°S
60°S
70°S
80°S

N
W
E
S

©EnchantedLearning.com

A. Coordinate Systems

A. Coordinate Systems

- Latitude and Longitude

A. Coordinate Systems

- Latitude and Longitude
- Determine location

A. Coordinate Systems

- Latitude and Longitude
- Determine location
- Imaginary grid on the Earth.

A. Coordinate Systems

- Latitude and Longitude
- Determine location
- Imaginary grid on the Earth.

- Every location on the planet has a set of coordinates

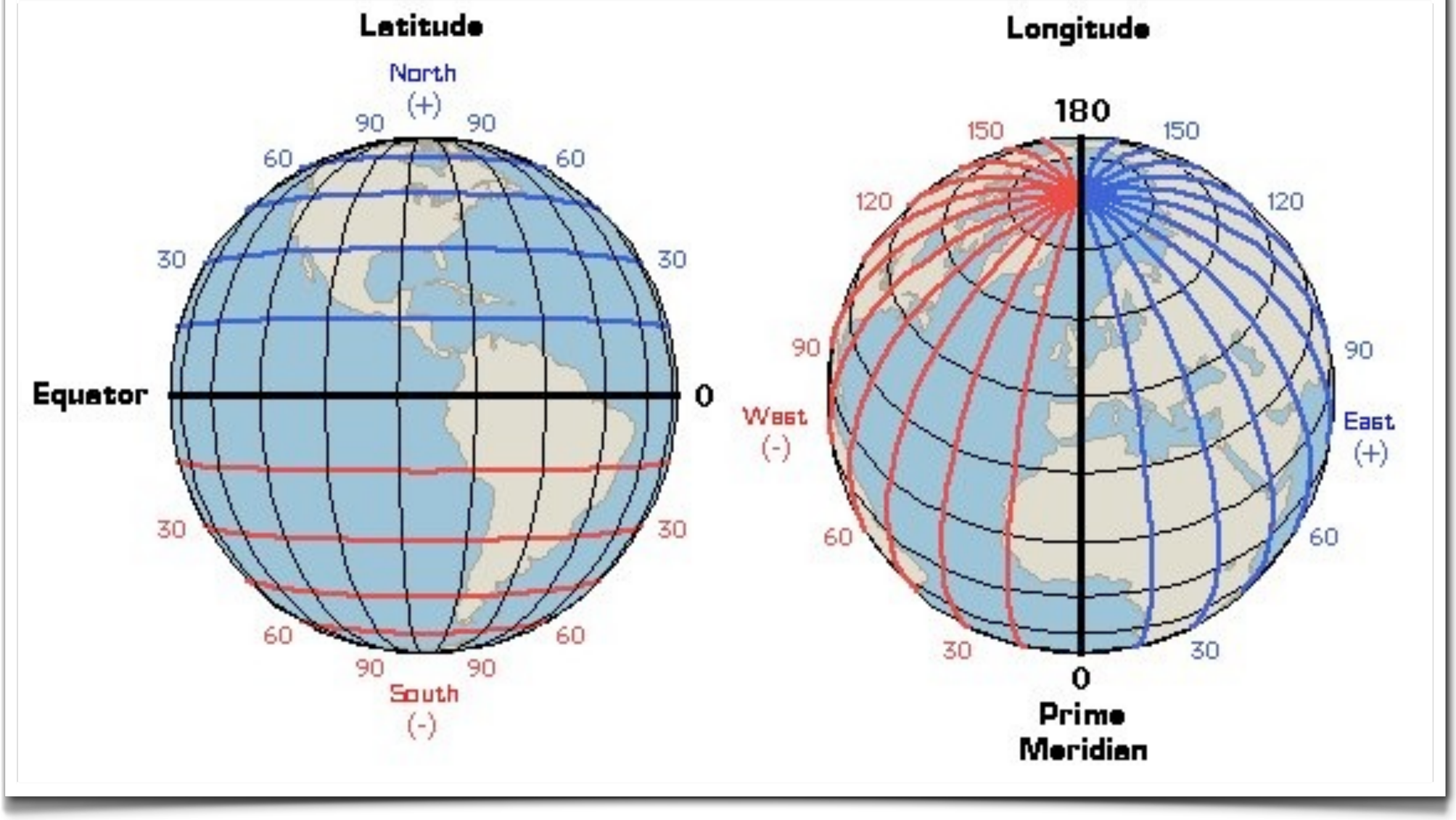
A. Coordinate Systems

- Latitude and Longitude
- Determine location
- Imaginary grid on the Earth.
- Every location on the planet has a set of coordinates
- A latitude value north or south of Equator

A. Coordinate Systems

- Latitude and Longitude
- Determine location
- Imaginary grid on the Earth.

- Every location on the planet has a set of coordinates
- A latitude value north or south of Equator
- A longitude value east or west of Prime Meridian


Latitude
North
(+)
90
90
60
60
30
30
Equator
0
30
30
60
60
90
90
South
(-)
Longitude
180
150
150
120
120
90
90
West
(-)
East
(+)
60
60
30
30
0
Prime
Meridian

2. Latitude Lines

2. Latitude Lines

2. Latitude Lines

- PARALLELS

2. Latitude Lines

- PARALLELS
- EQUATOR is the main line of reference

2. Latitude Lines

- PARALLELS
- EQUATOR is the main line of reference
- NEVER INTERSECT and form circles around the Earth.

2. Latitude Lines

- PARALLELS
- EQUATOR is the main line of reference
- NEVER INTERSECT and form circles around the Earth.
- North or South of the Equator

2. Latitude Lines

- PARALLELS
- EQUATOR is the main line of reference
- NEVER INTERSECT and form circles around the Earth.
- North or South of the Equator
- Equator is equal to Zero (0) degrees

2. Latitude Lines

- PARALLELS
- EQUATOR is the main line of reference
- NEVER INTERSECT and form circles around the Earth.
- North or South of the Equator
- Equator is equal to Zero (0) degrees
- The North Pole equals 90 degrees North

2. Latitude Lines

- PARALLELS
- EQUATOR is the main line of reference
- NEVER INTERSECT and form circles around the Earth.
- North or South of the Equator
- Equator is equal to Zero (0) degrees
- The North Pole equals 90 degrees North
- The South Pole equals 90 degrees South.

2. Latitude Lines

- PARALLELS
- EQUATOR is the main line of reference
- NEVER INTERSECT and form circles around the Earth.
- North or South of the Equator
- Equator is equal to Zero (0) degrees
- The North Pole equals 90 degrees North
- The South Pole equals 90 degrees South.
- "FLATITUDE"

2. Latitude Lines

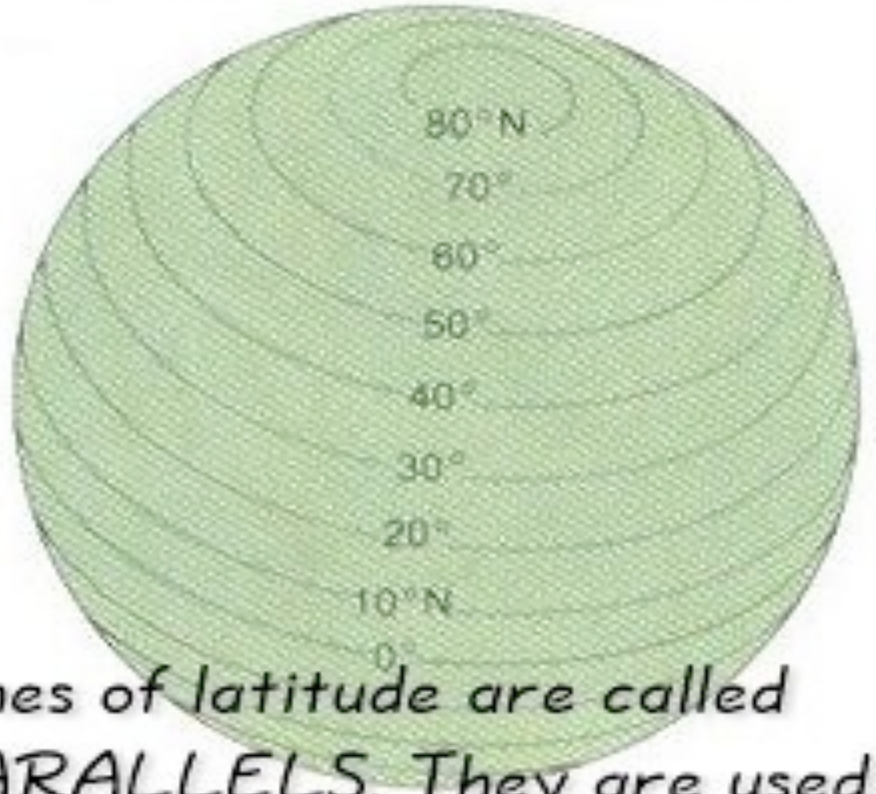
- PARALLELS
- EQUATOR is the main line of reference
- NEVER INTERSECT and form circles around the Earth.
- North or South of the Equator
- Equator is equal to Zero (0) degrees
- The North Pole equals 90 degrees North
- The South Pole equals 90 degrees South.
- "FLATITUDE"
- The Altitude of Polaris is equal to the Latitude of the observer

ALGERIA
LIBYA

ALGERIA
LIBYA

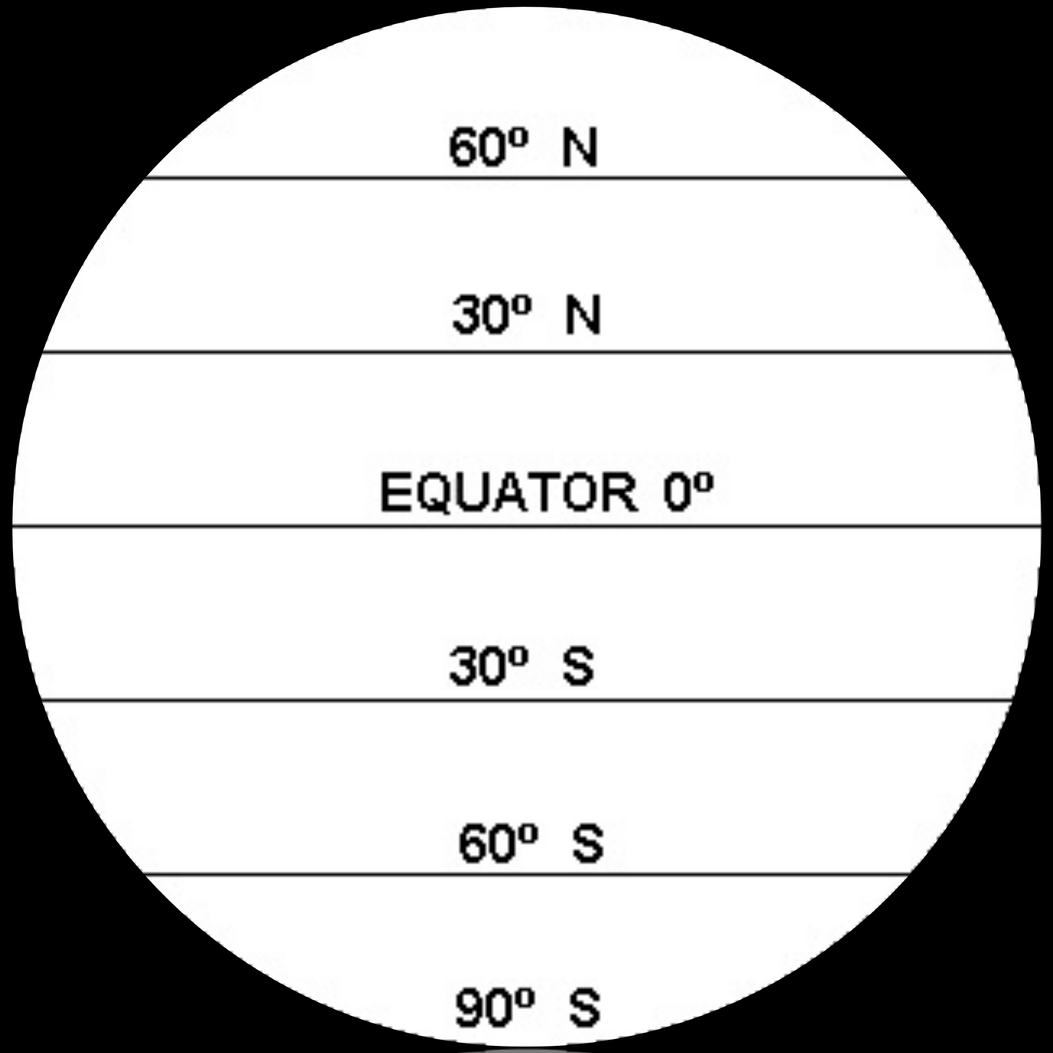
ALGERIA
LIBYA

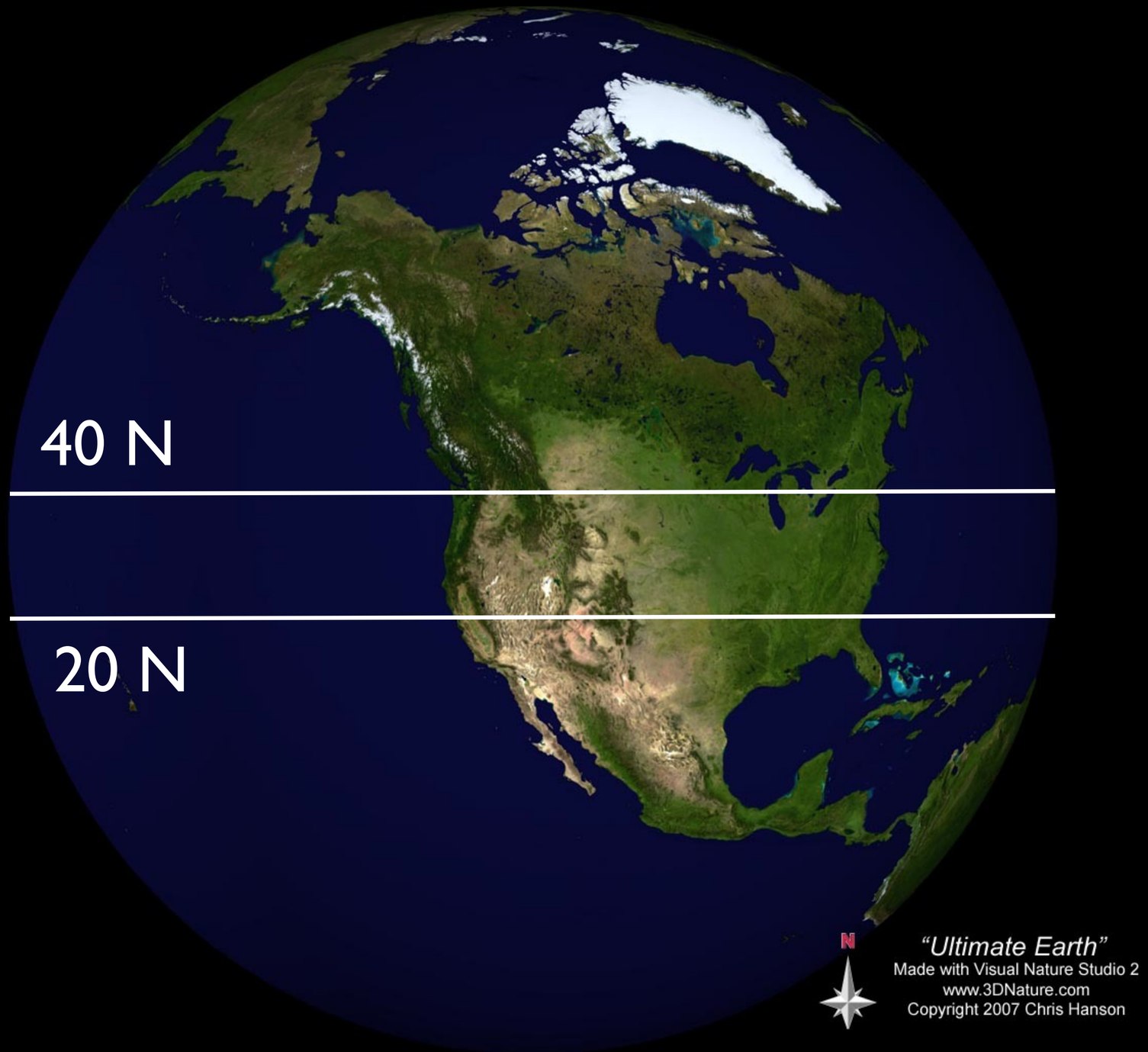
Lines of Latitude

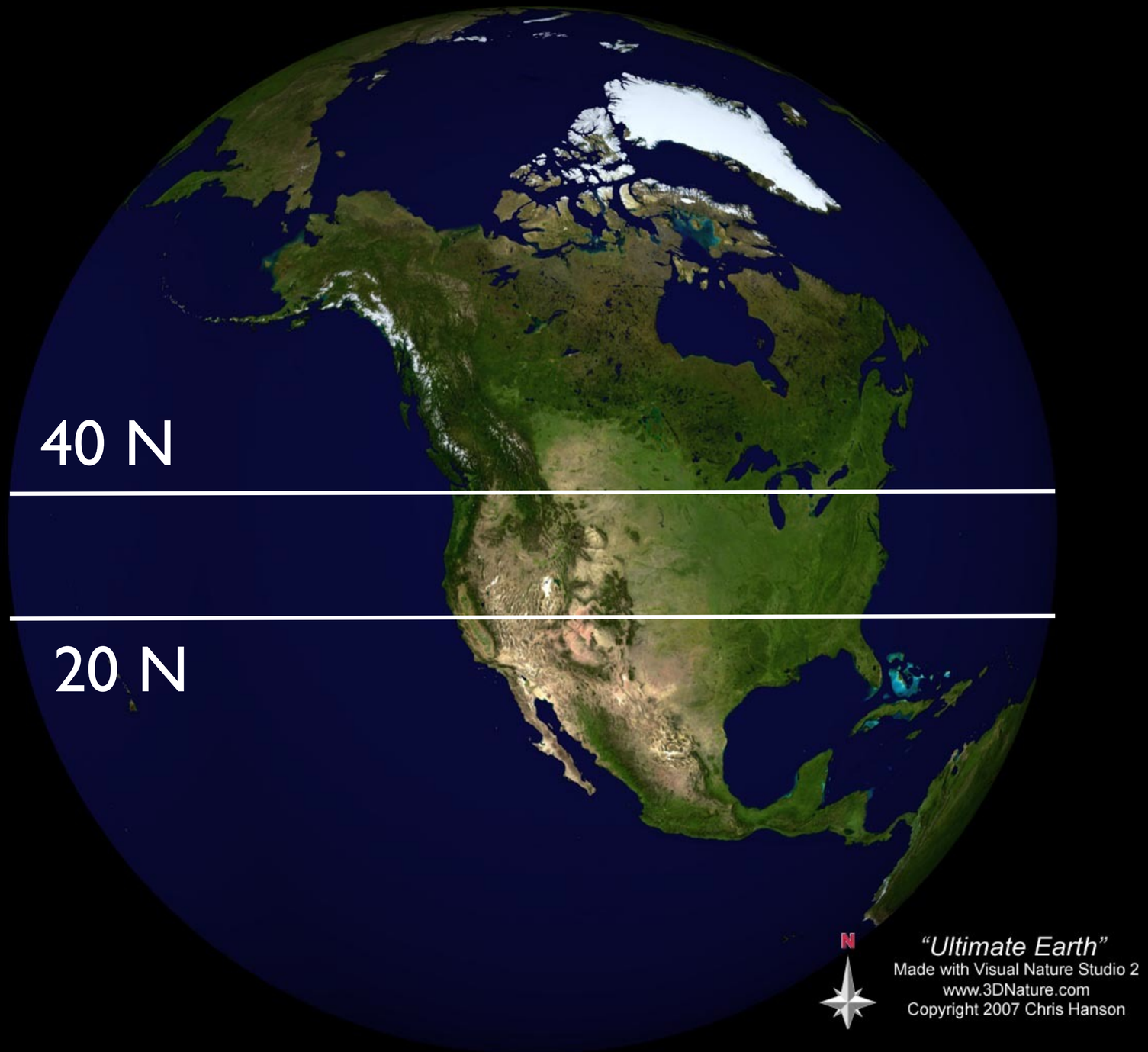


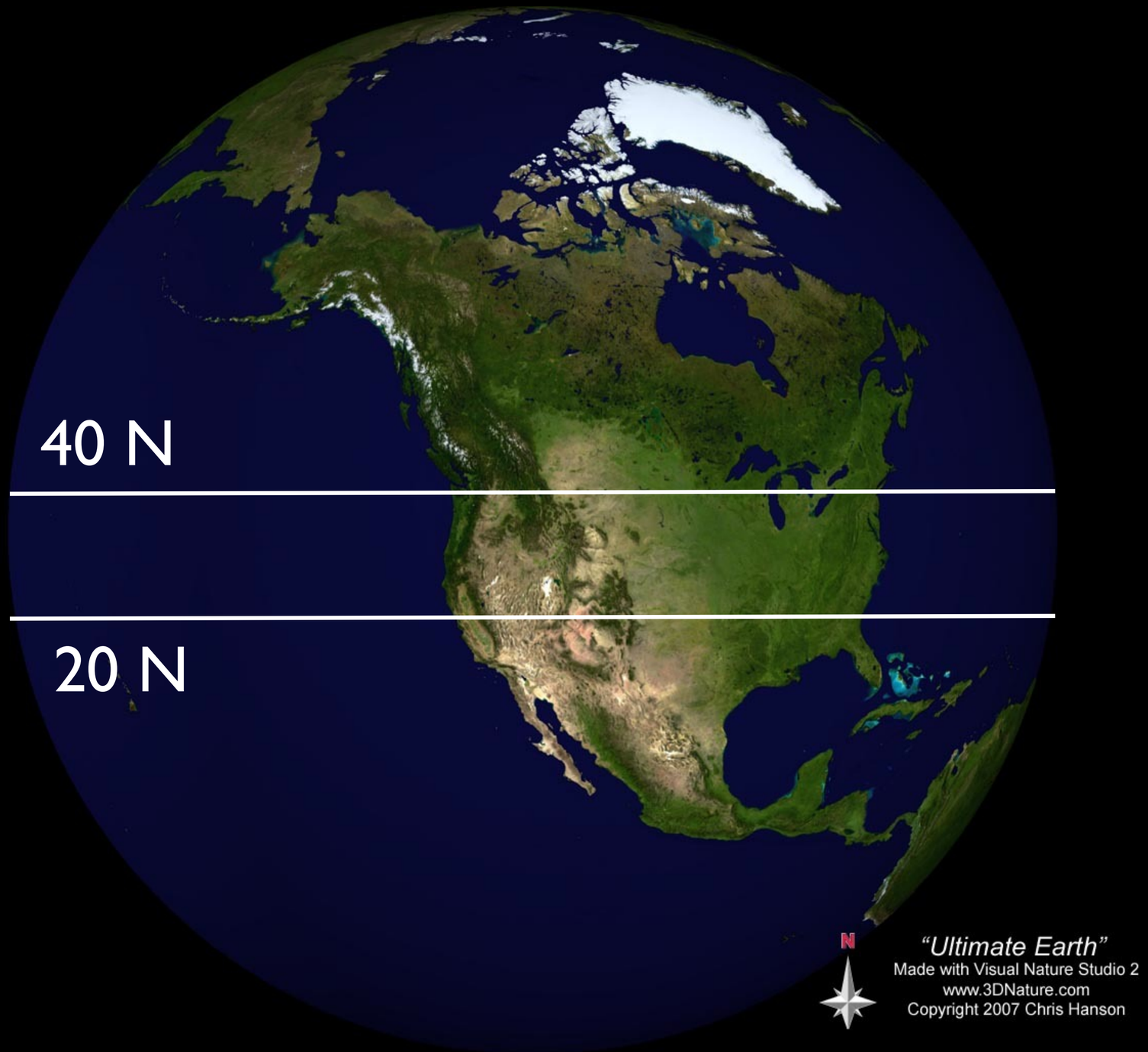
Lines of latitude are called PARALLELS. They are used to measure the NORTH - SOUTH distances.

Copyright ©1999, R. Evans. All Rights Reserved.




40 N
20 N
N
"Ultimate Earth"
Made with Visual Nature Studio 2
www.3DNature.com
Copyright 2007 Chris Hanson


40 N
20 N
N
"Ultimate Earth"
Made with Visual Nature Studio 2
www.3DNature.com
Copyright 2007 Chris Hanson


40 N
20 N
N
"Ultimate Earth"
Made with Visual Nature Studio 2
www.3DNature.com
Copyright 2007 Chris Hanson

Major Latitude Lines

Major Latitude Lines

- 23.5 North-Tropic of Cancer

Major Latitude Lines

- 23.5 North-Tropic of Cancer
- 23.5 South-Tropic of Capricorn

Major Latitude Lines

- 23.5 North-Tropic of Cancer
- 23.5 South-Tropic of Capricorn
- 66.5 North-Arctic Circle

Major Latitude Lines

- 23.5 North-Tropic of Cancer
- 23.5 South-Tropic of Capricorn
- 66.5 North-Arctic Circle
- 66.5 South-Antarctic Circle

3. Longitude Lines

3. Longitude Lines

3. Longitude Lines

- Intersect at the North Pole and the South Pole

3. Longitude Lines

- Intersect at the North Pole and the South Pole
- Create half circles around the Earth.

3. Longitude Lines

- Intersect at the North Pole and the South Pole
- Create half circles around the Earth.
- Prime Meridian is zero (0) degrees

3. Longitude Lines

- Intersect at the North Pole and the South Pole
- Create half circles around the Earth.
- Prime Meridian is zero (0) degrees
- Runs through Greenwich, England.

3. Longitude Lines

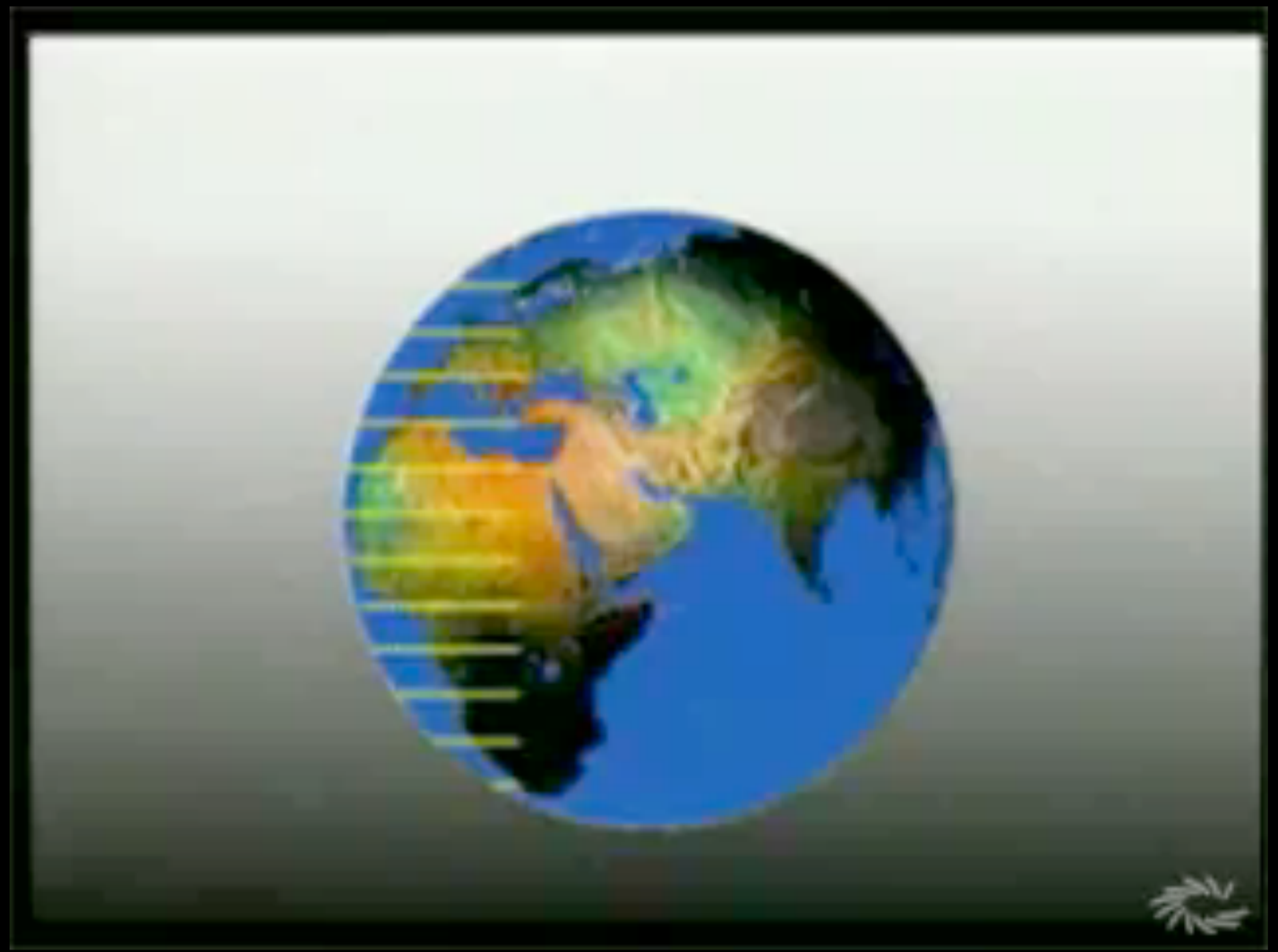
- Intersect at the North Pole and the South Pole
- Create half circles around the Earth.
- Prime Meridian is zero (0) degrees
- Runs through Greenwich, England.
- Ancient Navigators set clocks here according to the sun.

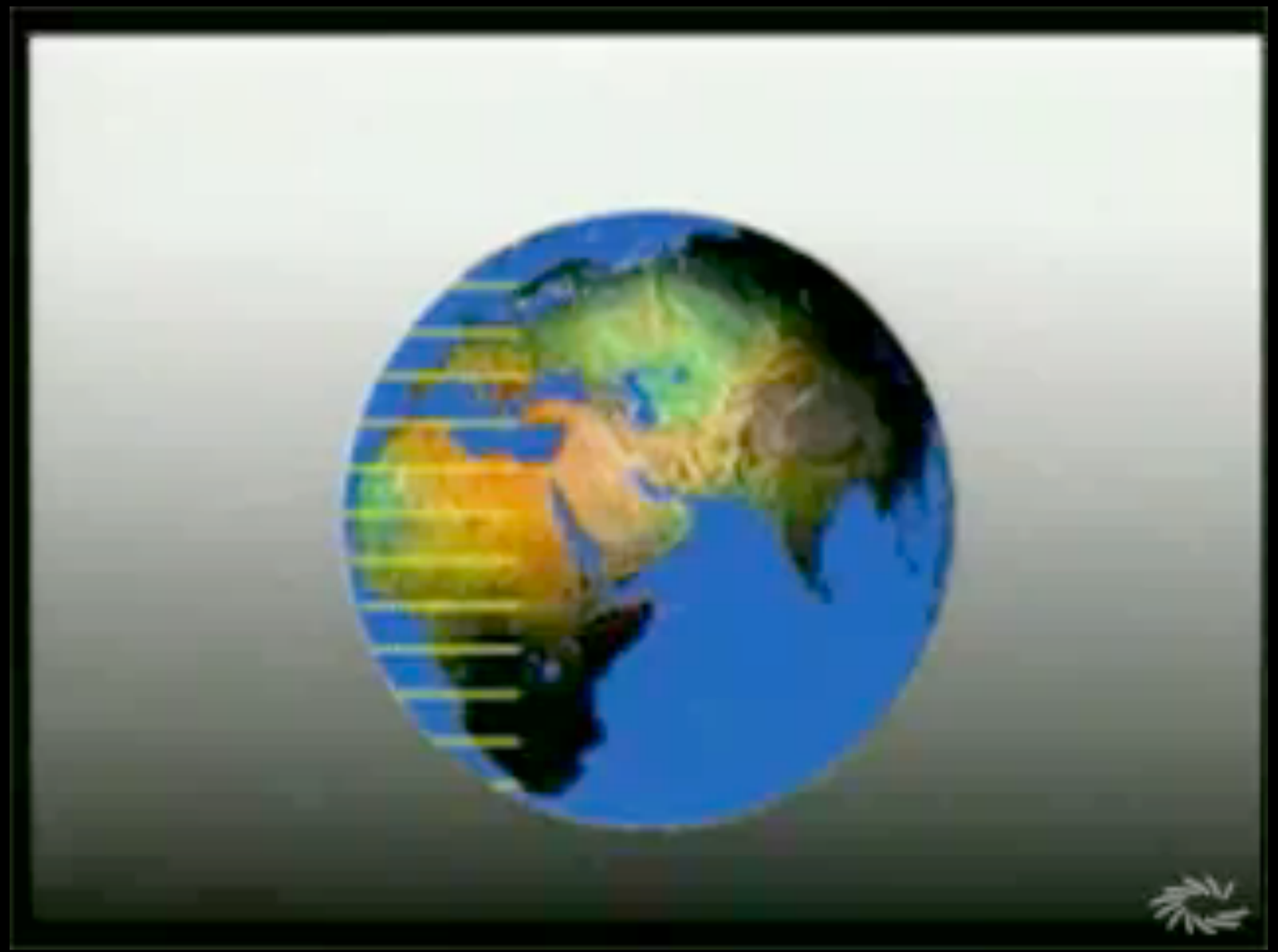
3. Longitude Lines

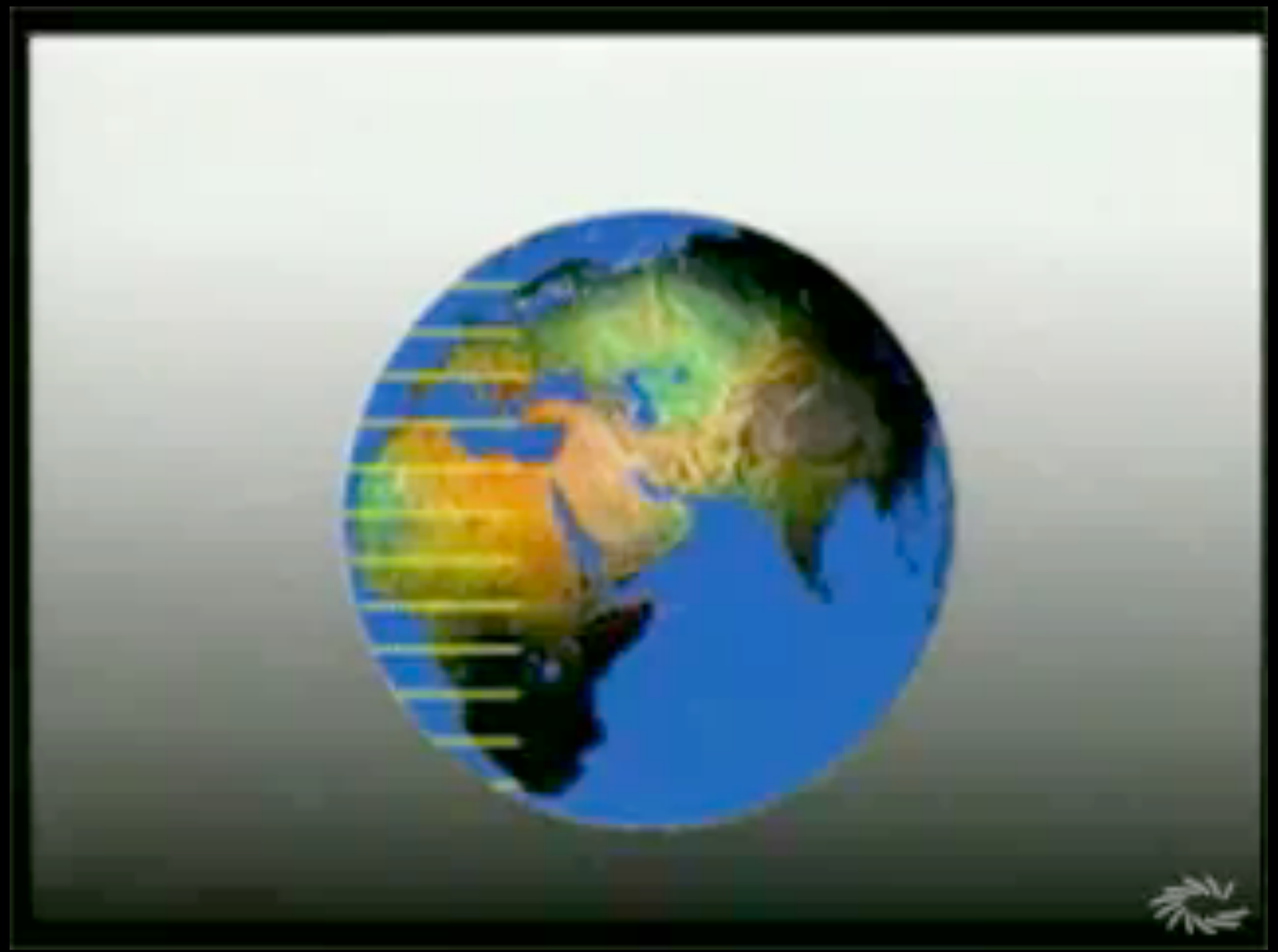
- Intersect at the North Pole and the South Pole
- Create half circles around the Earth.
- Prime Meridian is zero (0) degrees
- Runs through Greenwich, England.
- Ancient Navigators set clocks here according to the sun.
- Also called Meridians

3. Longitude Lines

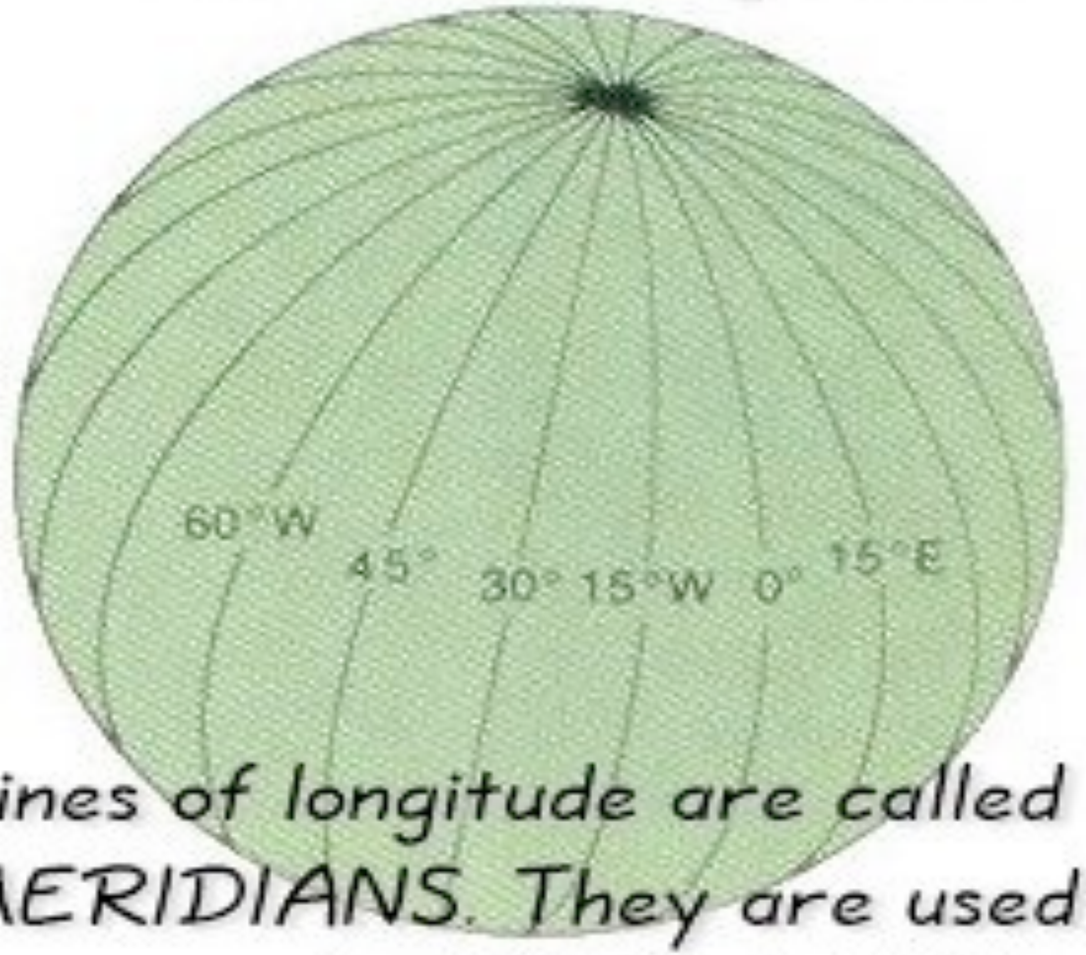
- Intersect at the North Pole and the South Pole
- Create half circles around the Earth.
- Prime Meridian is zero (0) degrees
- Runs through Greenwich, England.
- Ancient Navigators set clocks here according to the sun.
- Also called Meridians
- Are either East or West of the Prime Meridian







Lines of Longitude



Lines of longitude are called MERIDIANS. They are used to measure the EAST- WEST distances.

Copyright © 1999, R. Evans. All Rights Reserved.

4. Prime Meridian and International Date Line

4. Prime Meridian and International Date Line

- As one travels east or west from the prime meridian (0 degrees), the longitude increases until a maximum of 180 degrees is reached on the other side of the Earth.

4. Prime Meridian and International Date Line

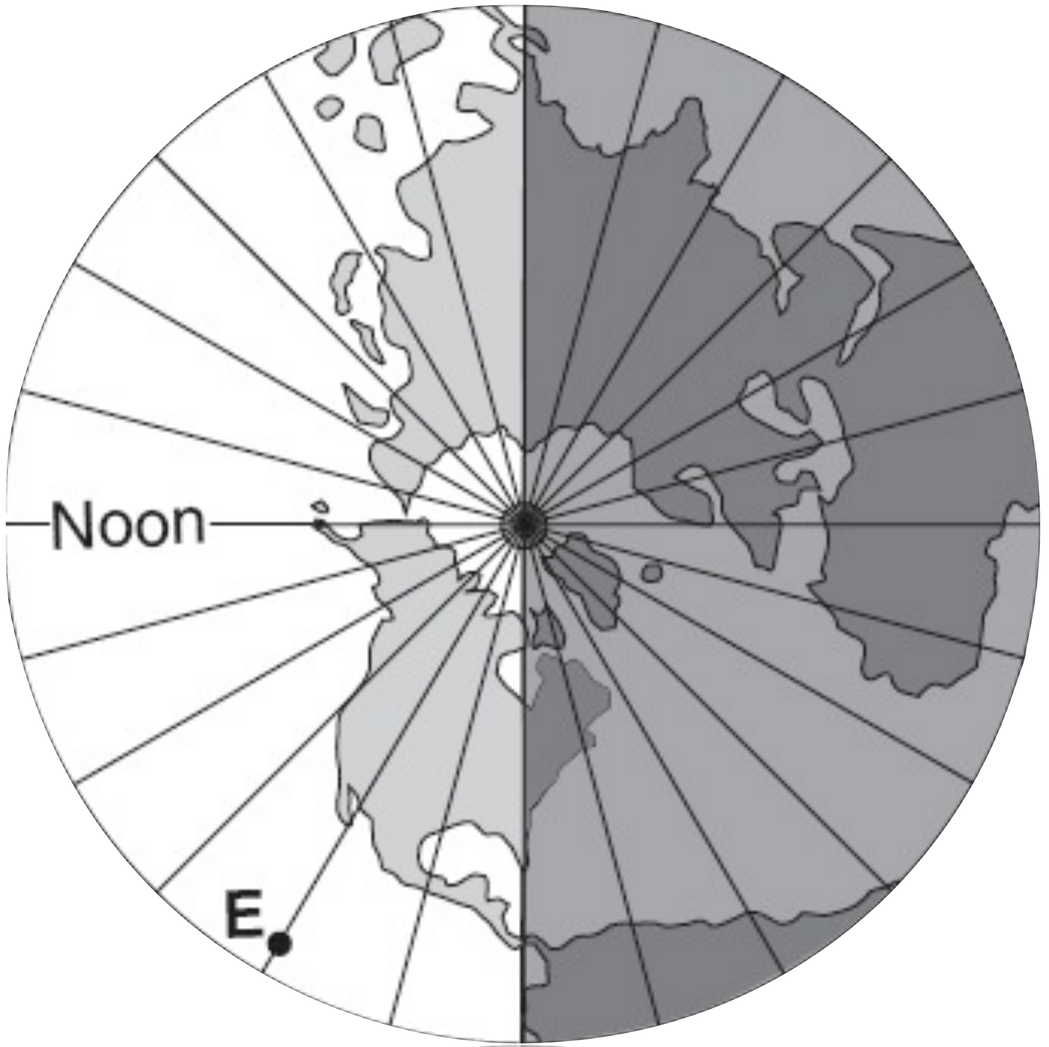
- As one travels east or west from the prime meridian (0 degrees), the longitude increases until a maximum of 180 degrees is reached on the other side of the Earth.
- The continuation of the Prime Meridian on the other side of the Earth is the International Date Line.

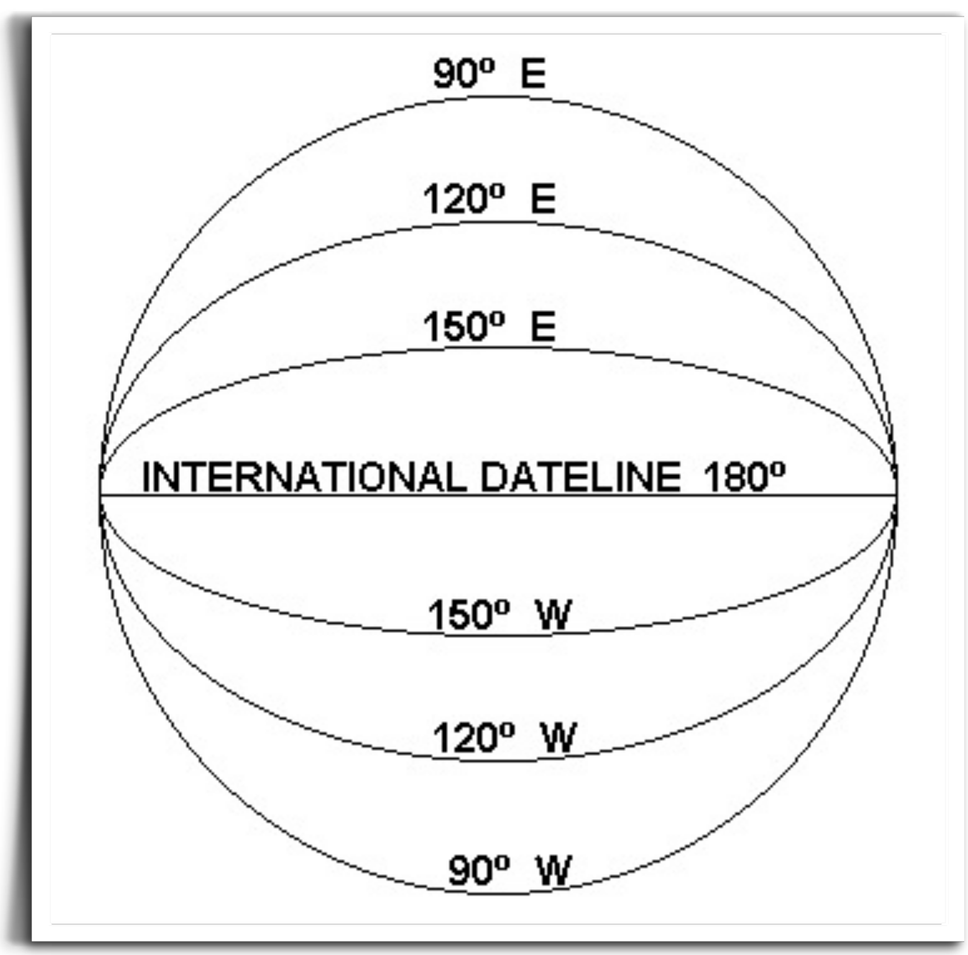
4. Prime Meridian and International Date Line

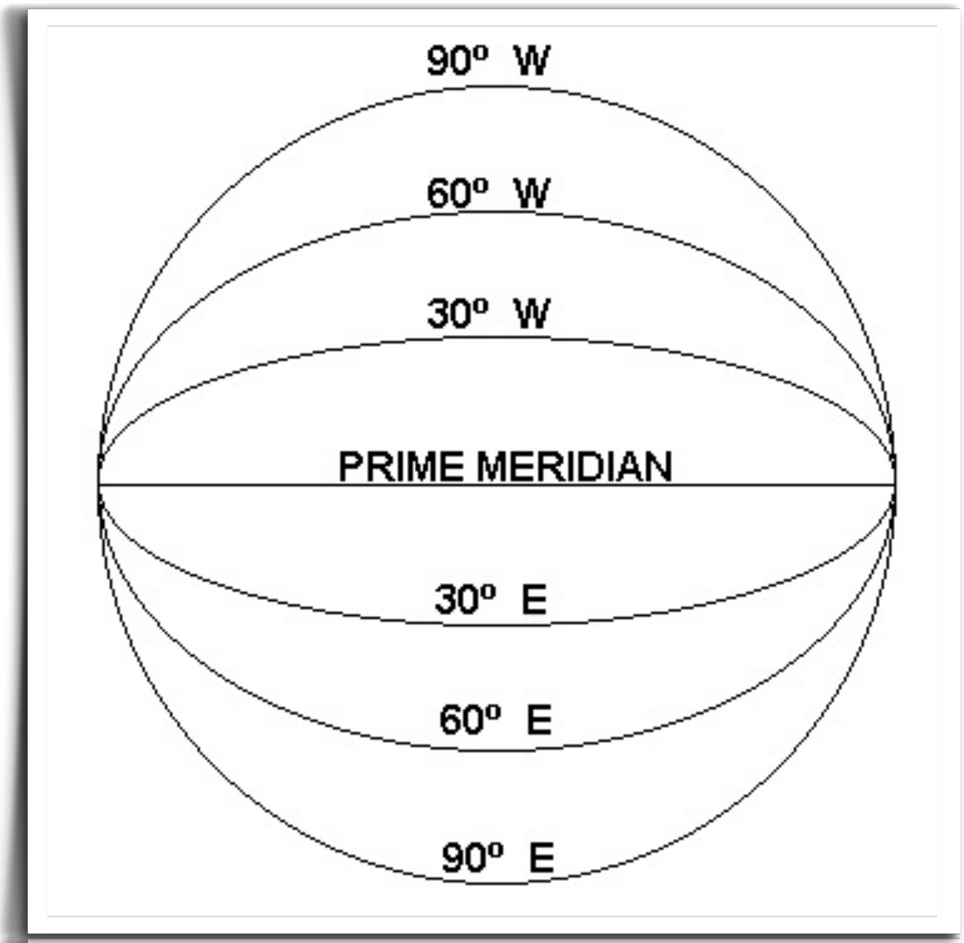
- As one travels east or west from the prime meridian (0 degrees), the longitude increases until a maximum of 180 degrees is reached on the other side of the Earth.
- The continuation of the Prime Meridian on the other side of the Earth is the International Date Line.
- Maximum Longitude is 180 degrees.

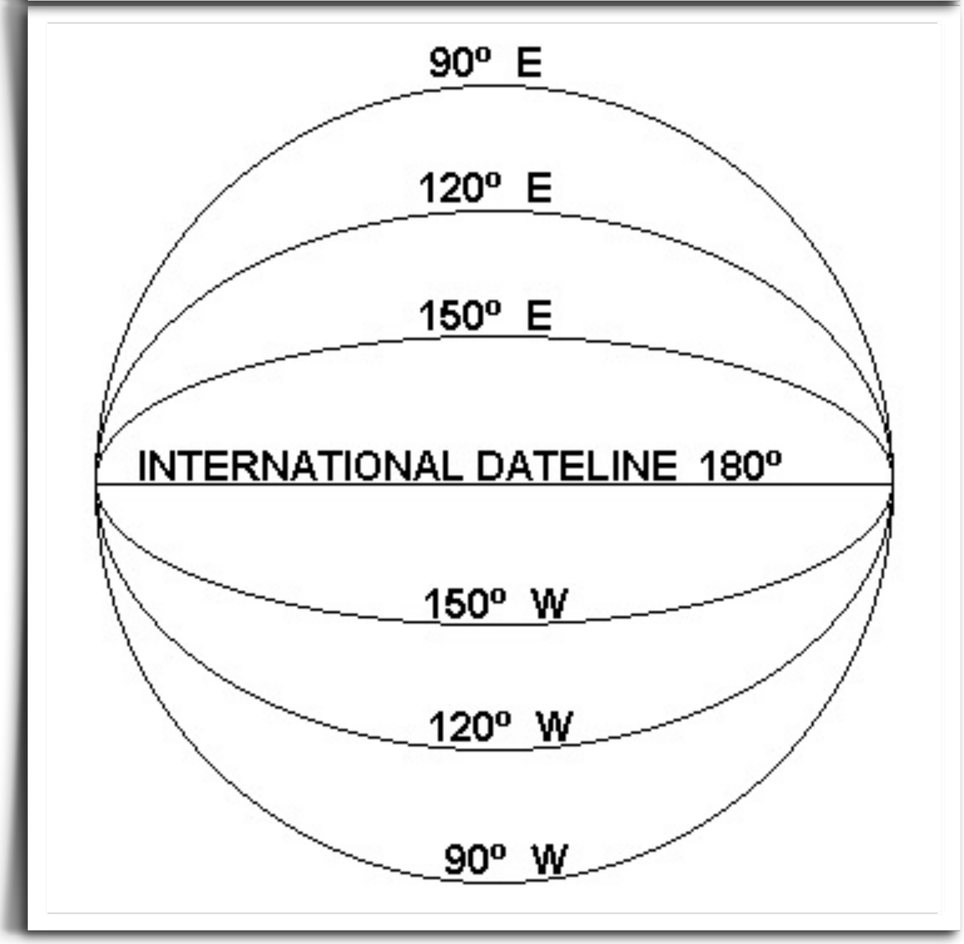
4. Prime Meridian and International Date Line

- As one travels east or west from the prime meridian (0 degrees), the longitude increases until a maximum of 180 degrees is reached on the other side of the Earth.
- The continuation of the Prime Meridian on the other side of the Earth is the International Date Line.
- Maximum Longitude is 180 degrees.
- An accurate clock called a chronometer keeps the time in Greenwich, England (Prime Meridian)…GMT – Greenwich Mean Time.


Noon
E

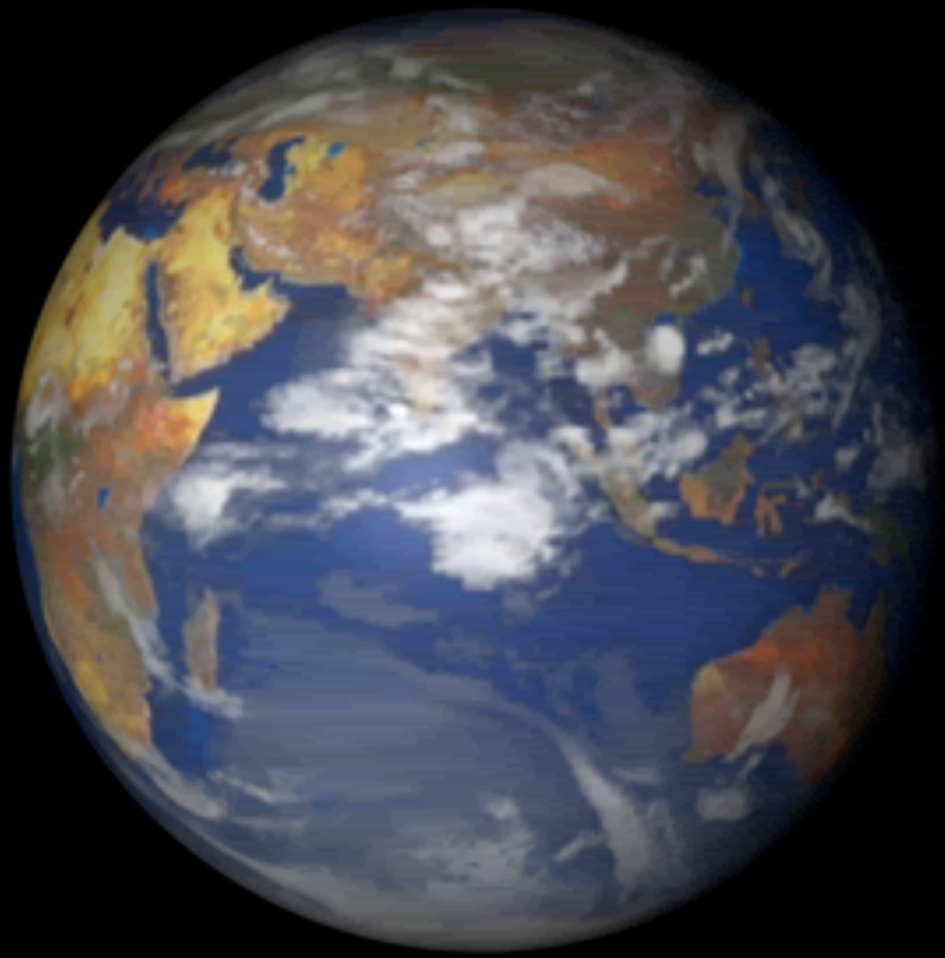

90º E
120º E
150º E
INTERNATIONAL DATELINE 180º
150º W
120º W
90º W


90º W
60º W
30º W
PRIME MERIDIAN
30º E
60º E
90º E

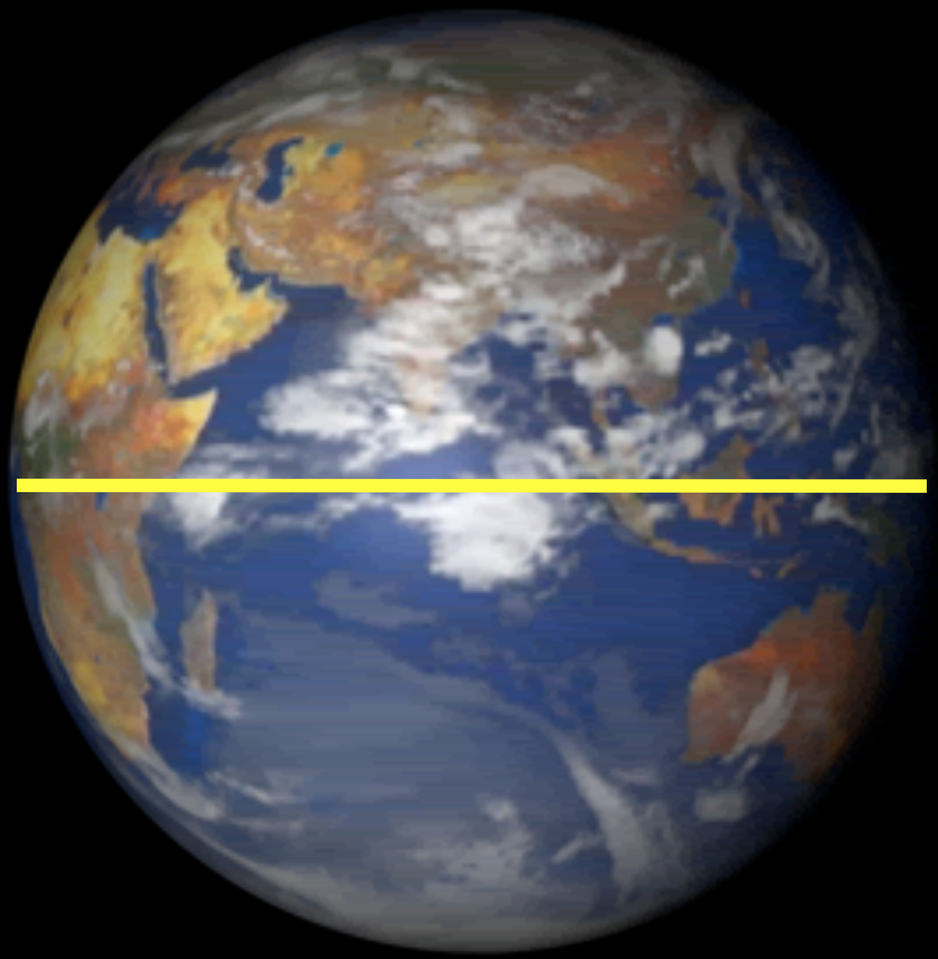

90º E
120º E
150º E
INTERNATIONAL DATELINE 180º
150º W
120º W
90º W

- Earth is divided into 4 Hemispheres:
  - North
  - South
  - East
  - West

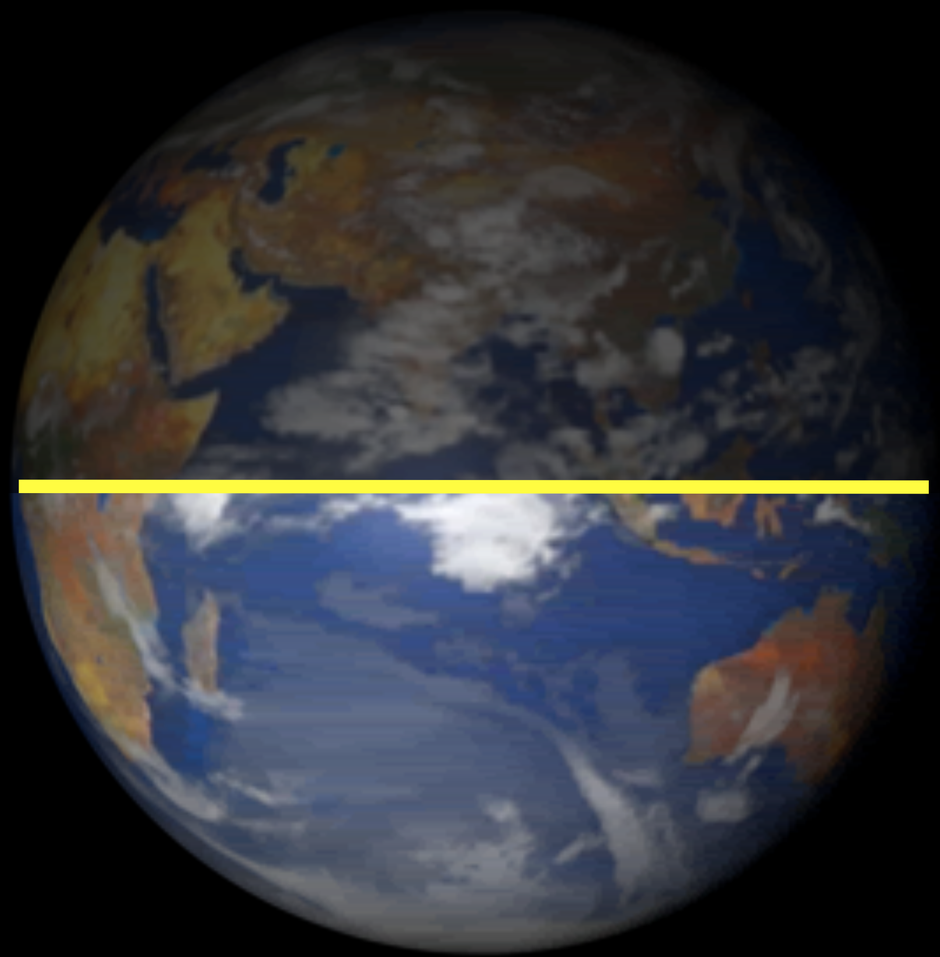
- Earth is divided into 4 Hemispheres:
  - North
  - South
  - East
  - West
- (Latitude N or S, Longitude E or W)

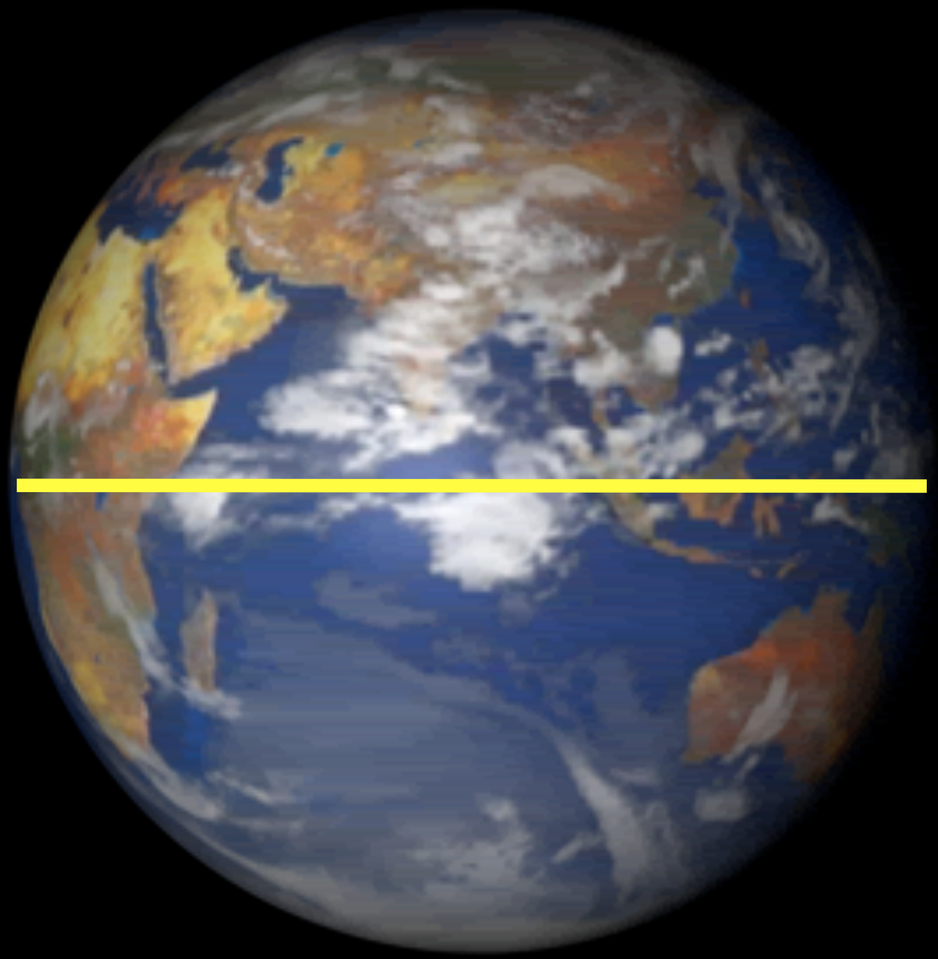


Wednesday, November 4, 2009

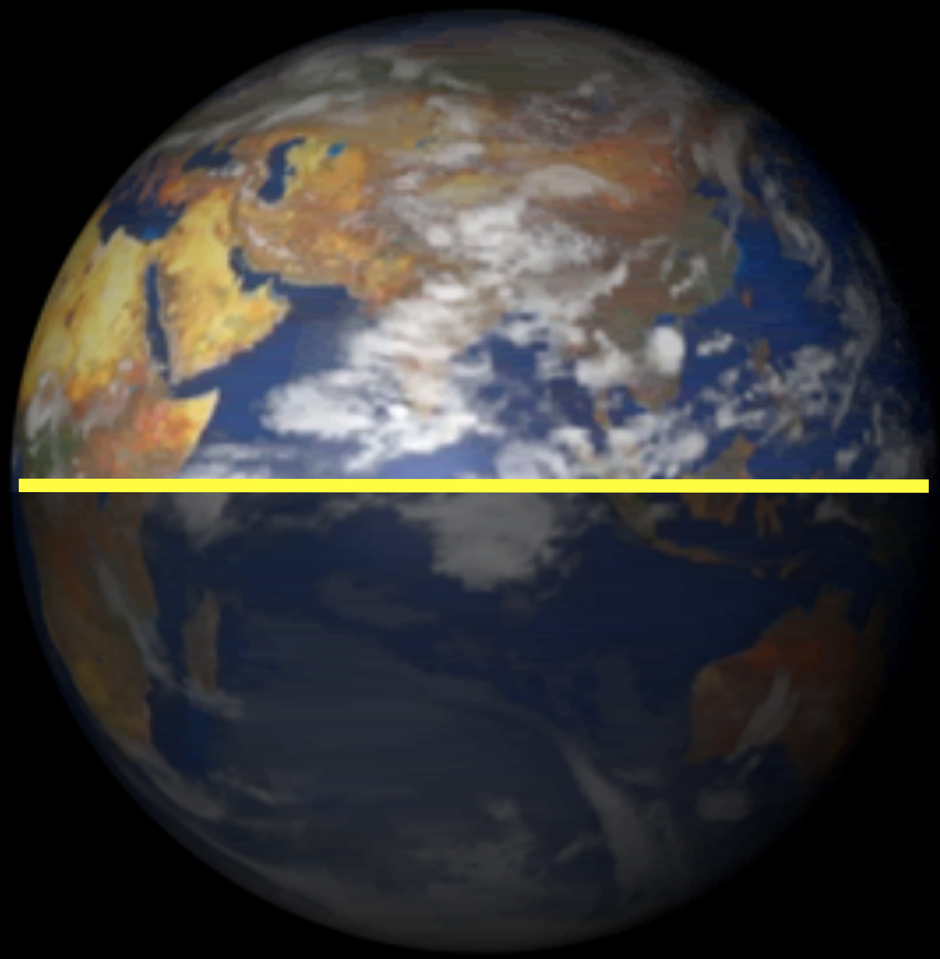


Wednesday, November 4, 2009

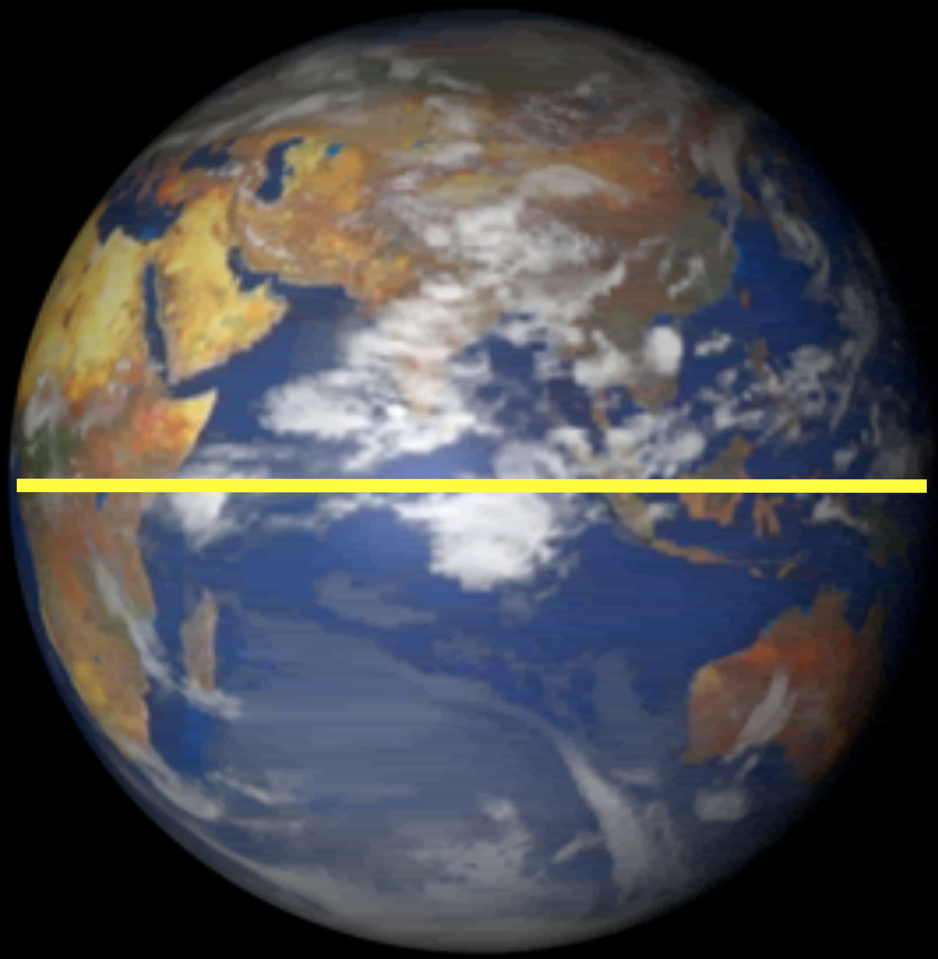




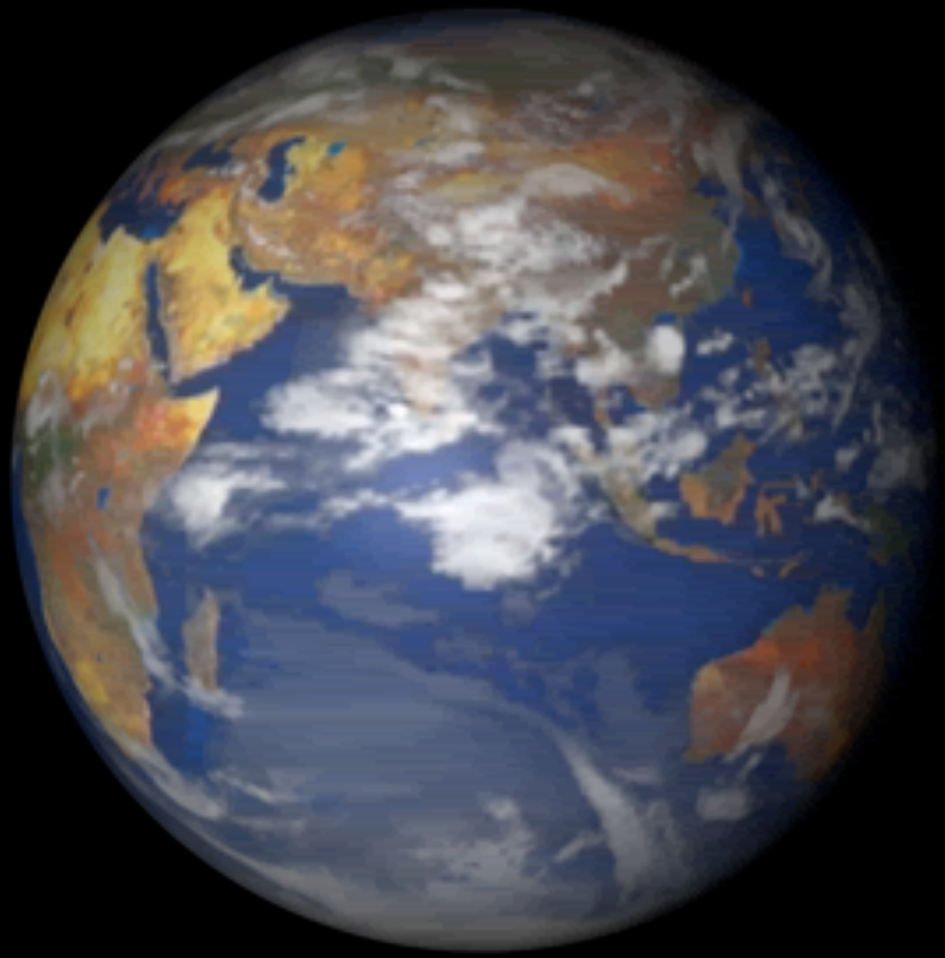
Wednesday, November 4, 2009



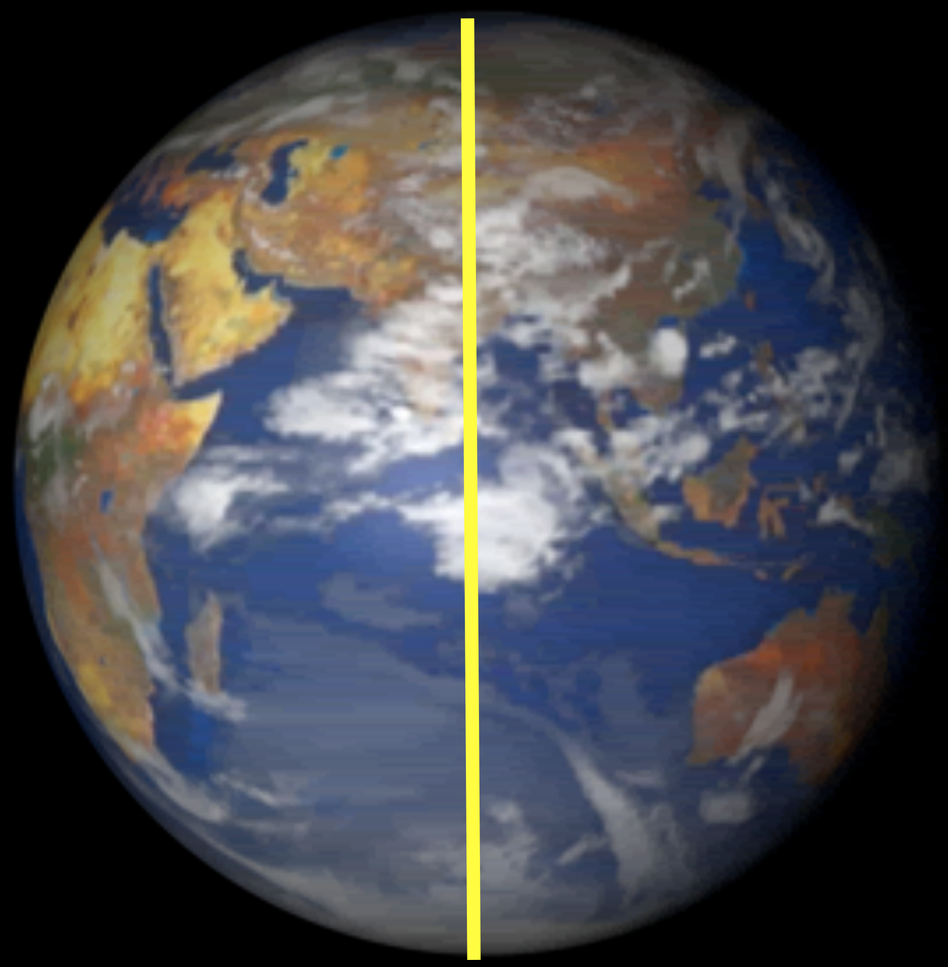
Wednesday, November 4, 2009



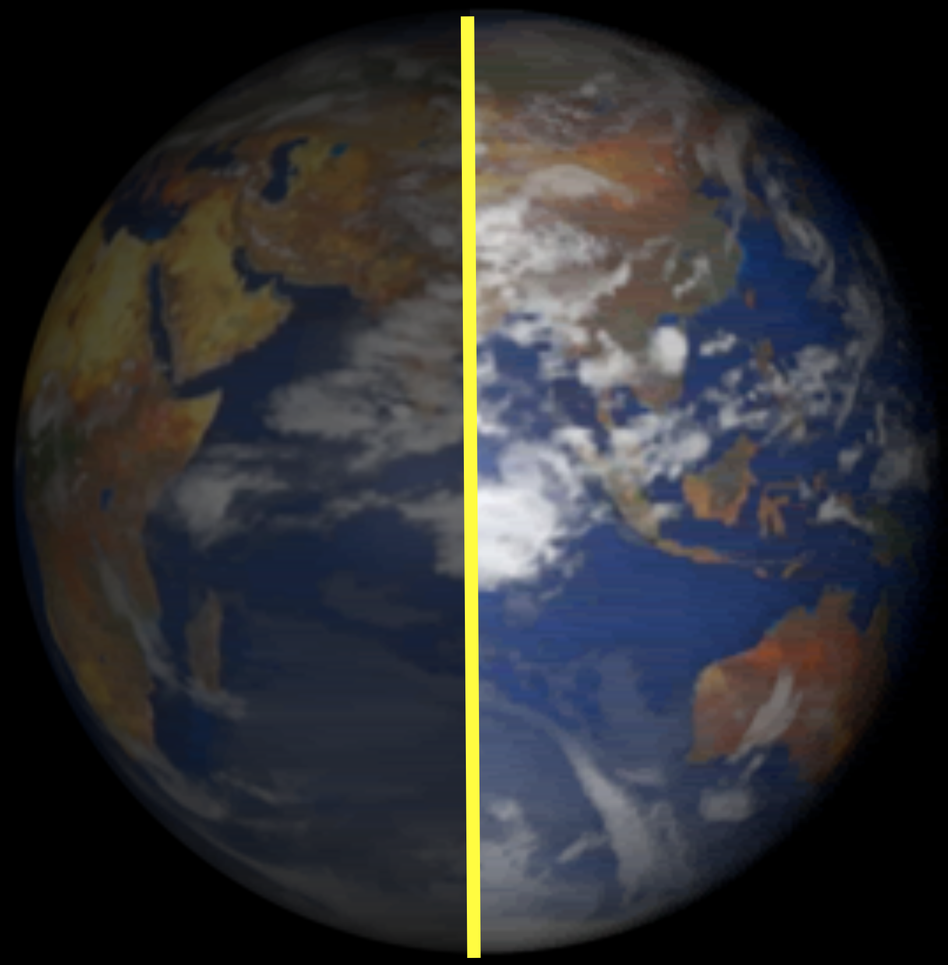
Wednesday, November 4, 2009



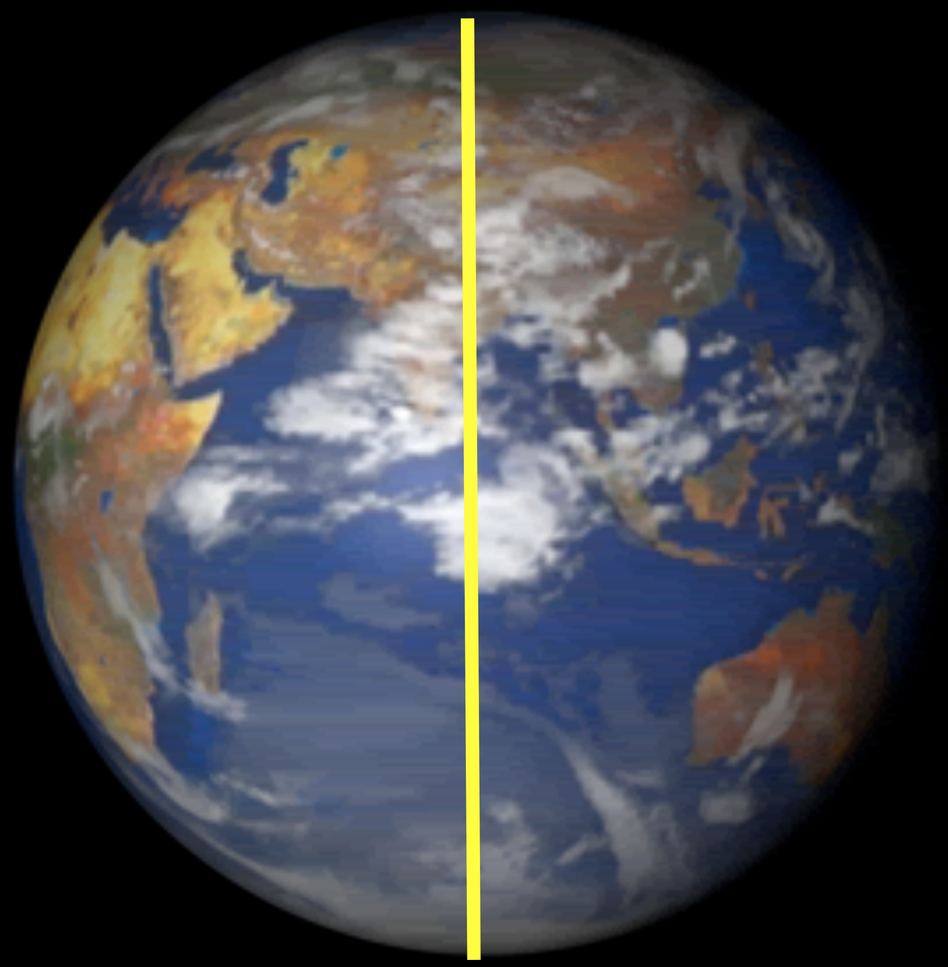
Wednesday, November 4, 2009



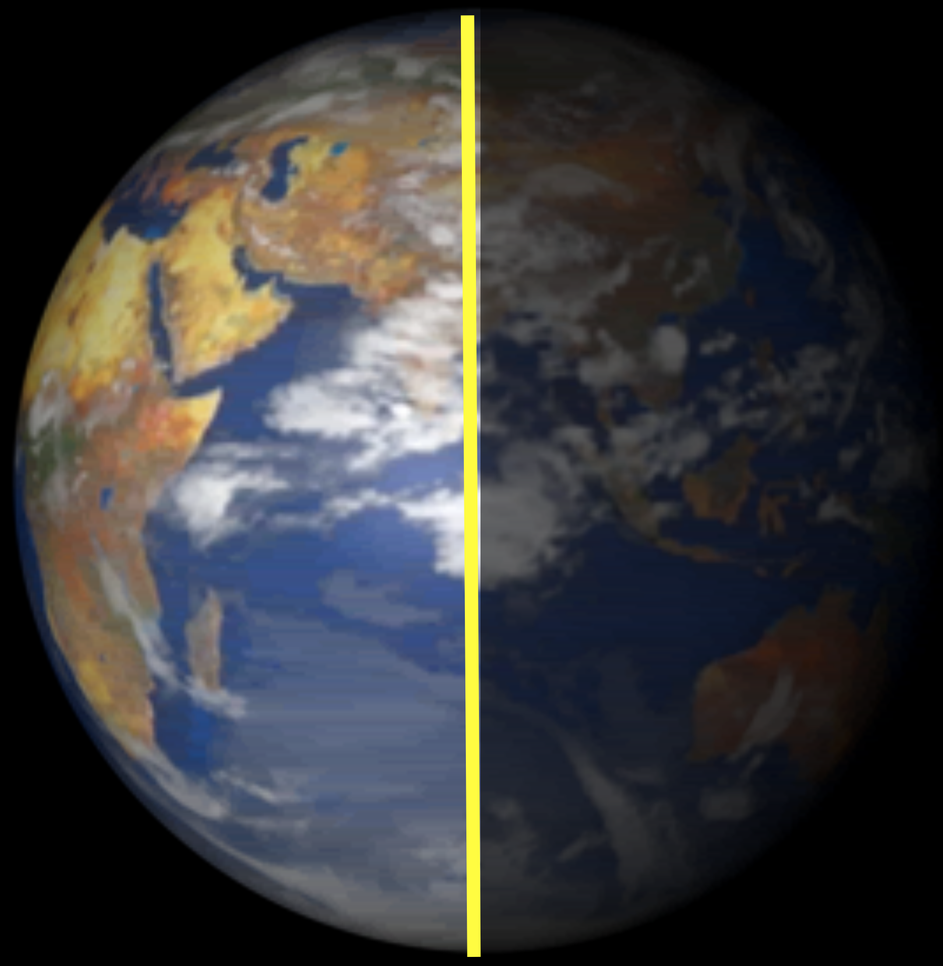
Wednesday, November 4, 2009



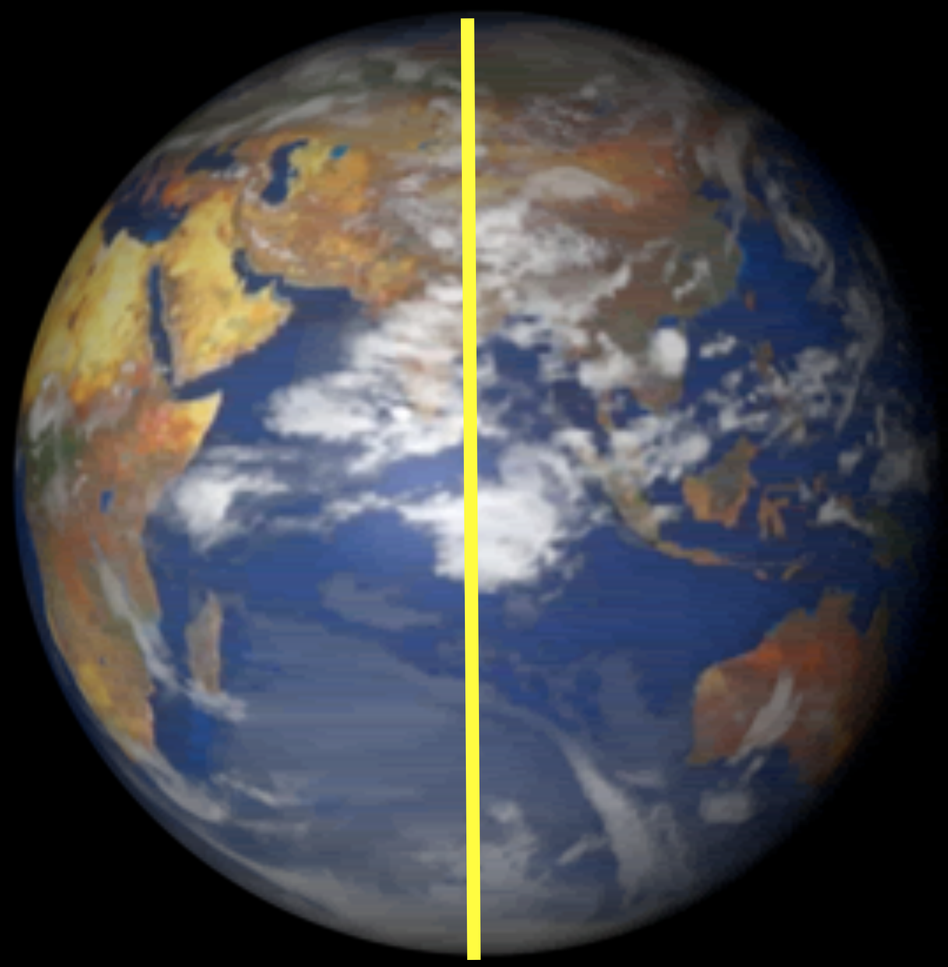
Wednesday, November 4, 2009



Wednesday, November 4, 2009



Wednesday, November 4, 2009



Wednesday, November 4, 2009

5. Measuring Longitude

5. Measuring Longitude

- Use a ***chronometer***

5. Measuring Longitude

- Use a ***chronometer***
- Earth spins at 360° every 24 hours (1 Day)

5. Measuring Longitude

- Use a ***chronometer***
- Earth spins at 360° every 24 hours (1 Day)
- Equal to 15° of longitude per hour.

5. Measuring Longitude

- Use a ***chronometer***
- Earth spins at 360° every 24 hours (1 Day)
- Equal to 15° of longitude per hour.
- 15° of longitude = 1 Hour Difference (Time Zone)

5. Measuring Longitude

- Use a ***chronometer***
- Earth spins at 360° every 24 hours (1 Day)
- Equal to 15° of longitude per hour.
- 15° of longitude = 1 Hour Difference (Time Zone)
- Longitude Tells Us TIME!!!!!

Steps on How to Determine Time

Steps on How to Determine Time

- Step 1: Check the Solar Time (High Noon)

Steps on How to Determine Time

- Step 1: Check the Solar Time (High Noon)
- Step 2: Check the time at the Prime Meridian (GMT)

Steps on How to Determine Time

- Step 1: Check the Solar Time (High Noon)
- Step 2: Check the time at the Prime Meridian (GMT)
- Step 3: Determine the number of hours difference.

Steps on How to Determine Time

- Step 1: Check the Solar Time (High Noon)
- Step 2: Check the time at the Prime Meridian (GMT)
- Step 3: Determine the number of hours difference.
- Step 4: Multiply that number by 15°

AS YOU MOVE EAST…

AS YOU MOVE EAST…
THE TIME DOES

AS YOU MOVE EAST…
THE TIME DOES
INCREASE! (LATER)

AS YOU MOVE EAST…
THE TIME DOES
INCREASE! (LATER)

AS YOU MOVE EAST…
THE TIME DOES
INCREASE! (LATER)

AS YOU MOVE WEST…

AS YOU MOVE EAST…
THE TIME DOES
INCREASE! (LATER)

AS YOU MOVE WEST…
THE TIME BECOMES

AS YOU MOVE EAST…
THE TIME DOES
INCREASE! (LATER)

AS YOU MOVE WEST…
THE TIME BECOMES
LESS! (EARLIER)

Earth Rotates 15° per Hour

Earth Rotates 15° per Hour

Each Time Zone-15° Wide

Earth Rotates 15° per Hour

Each Time Zone-15° Wide

Each Time Zone-1 Hour Difference

Earth Rotates 15° per Hour

Each Time Zone-15° Wide

Each Time Zone-1 Hour Difference

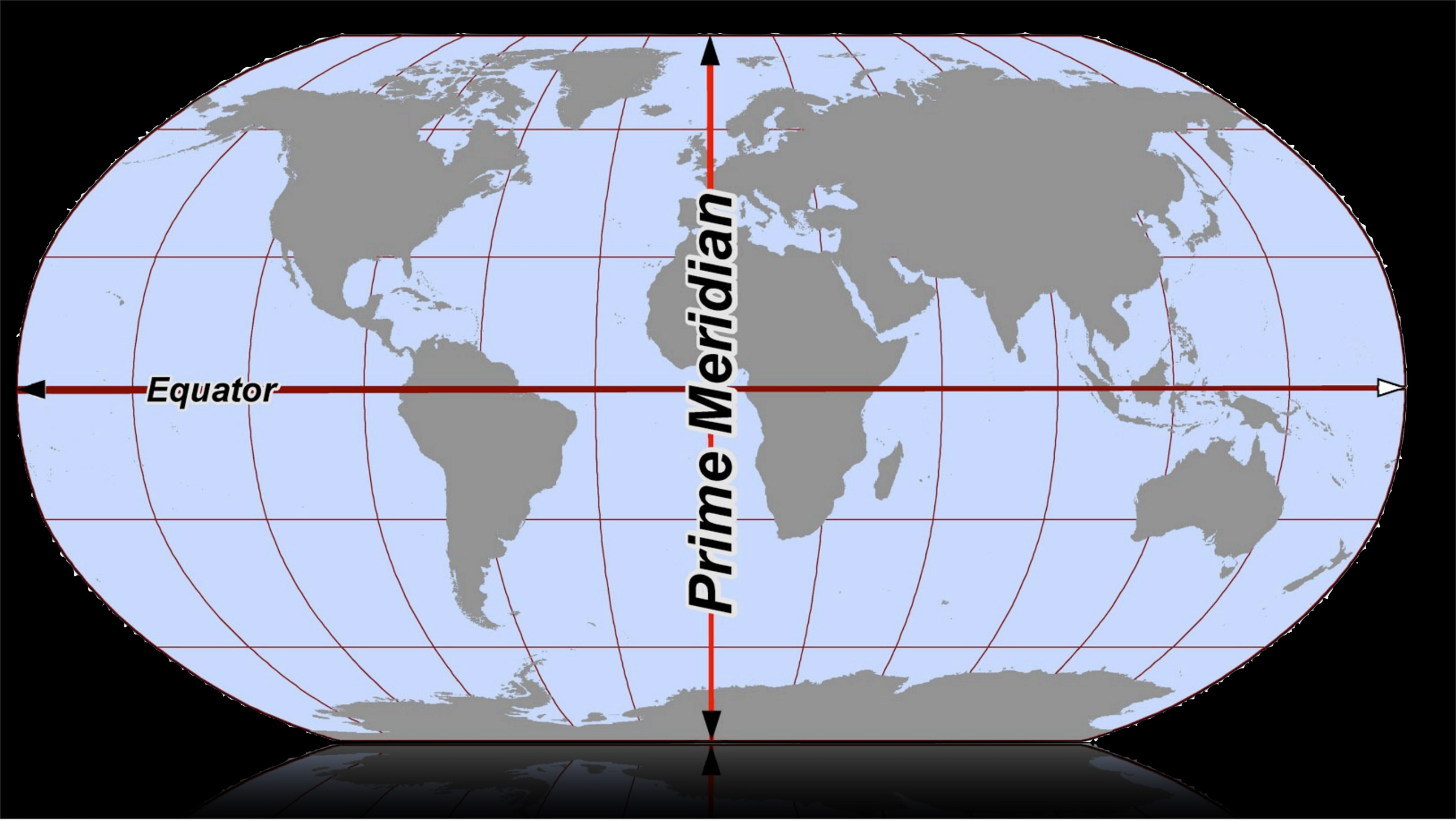
Earth Rotates 15° per Hour

Each Time Zone-15° Wide

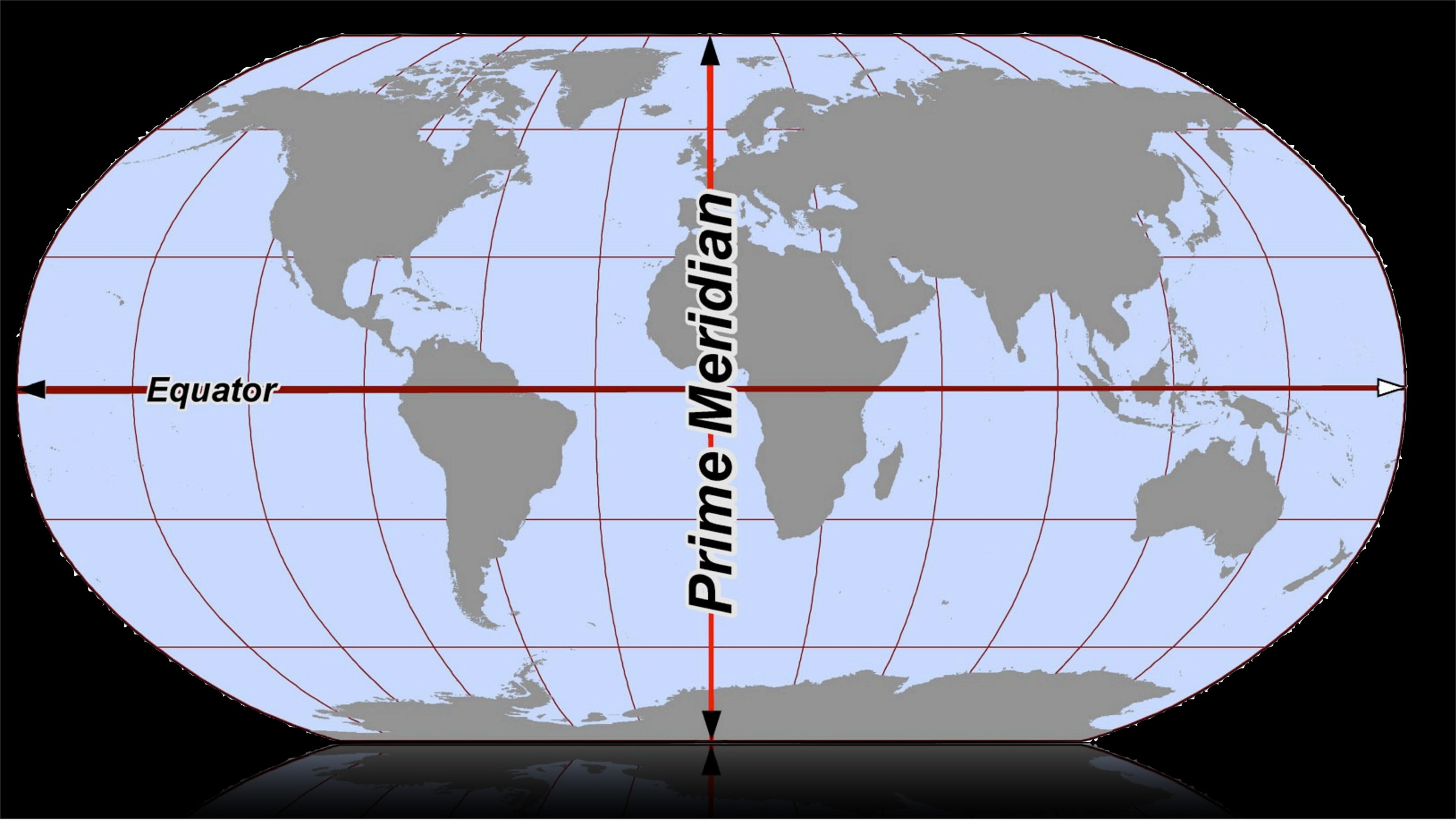
Each Time Zone-1 Hour Difference

F.Y.R.O.M. - The Former Yugoslav Republic of Macedonia
Greenland (DENMARK)
Jan Mayen (NORWAY)
Greenland Sea
Denmark Strait
Norwegian Sea
Barents Sea
Hammerfest
Tromsø
Murmansk
Kiruna
White Sea
Arkhangel'sk
Reykjavik
ICELAND
Arctic Circle
Luleå
Oulu
NORWAY
Umeå
FINLAND
Lake Onega
Trondheim
Tórshavn
Faroe Islands (DENMARK)
SWEDEN
Gulf of Bothnia
Tampere
Lake Ladoga
SHETLAND ISLANDS
Gävle
Turku
Helsinki
St. Petersburg
Gulf of Finland
Bergen
Oslo
Stockholm
ALAND ISLANDS
Tallinn
ESTONIA
RUSSIA
Rockall (U.K.)
ORKNEY ISLANDS
HEBRIDES
Stavanger
Moscow
North Atlantic Ocean
Aberdeen
Skagerrak
Göteborg
Gotland
Rīga
LATVIA
Baltic Sea
North Sea
Glasgow
Edinburgh
UNITED
DENMARK
Malmö
Oland
LITHUANIA
Vilnius
Vitsyebsk
Smolensk
Belfast
Copenhagen
Kaliningrad
RUSSIA
Mahilyow
Minsk
BELARUS
Isle of Man (U.K.)
Bornholm
Gdańsk
Hrodna
Homyel'
Dublin
Irish Sea
Leeds
Manchester
Liverpool
IRELAND
KINGDOM
Birmingham
Cardiff
Hamburg
Bremen
Berlin
Poznań
Warsaw
POLAND
Brest
Kiev
Amsterdam
NETH.
Rotterdam
London
Łódź
Wrocław
Rivne
Celtic Sea
Essen
Leipzig
Cologne
Brussels
Lille
BEL.
Bonn
GERMANY
Prague
Kraków
L'viv
UKRAINE
English Channel
Guernsey (U.K.)
Jersey (U.K.)
Frankfurt am Main
CZECH REPUBLIC
Brno
Chernivtsi
Mykolayiv
Luxembourg
LUX.
Paris
Stuttgart
SLOVAKIA
Bratislava
Chişinău
Strasbourg
Munich
Vienna
Budapest
Cluj-Napoca
Iaşi
MOLDOVA
Odesa
Nantes
LIECH.
AUSTRIA
HUNGARY
Zürich
Bern
Vaduz
SWITZ.
Geneva
ROMANIA
Bay of Biscay
FRANCE
Ljubljana
Zagreb
Bucharest
Constanţa
Lyon
Milan
Venice
SLOVENIA
Turin
Bordeaux
Belgrade
Varna
Black Sea
Genoa
SAN MARINO
CROATIA
BOSNIA AND HERZEGOVINA
Bilbao
Toulouse
MONACO
Sarajevo
YUGOSLAVIA
BULGARIA
Sofia
Andorra la Vella
Marseille
Ligurian Sea
Florence
Porto
ANDORRA
ITALY
Adriatic Sea
İstanbul
Zaragoza
Corsica
Rome
Skopje
F.Y.R.O.M.

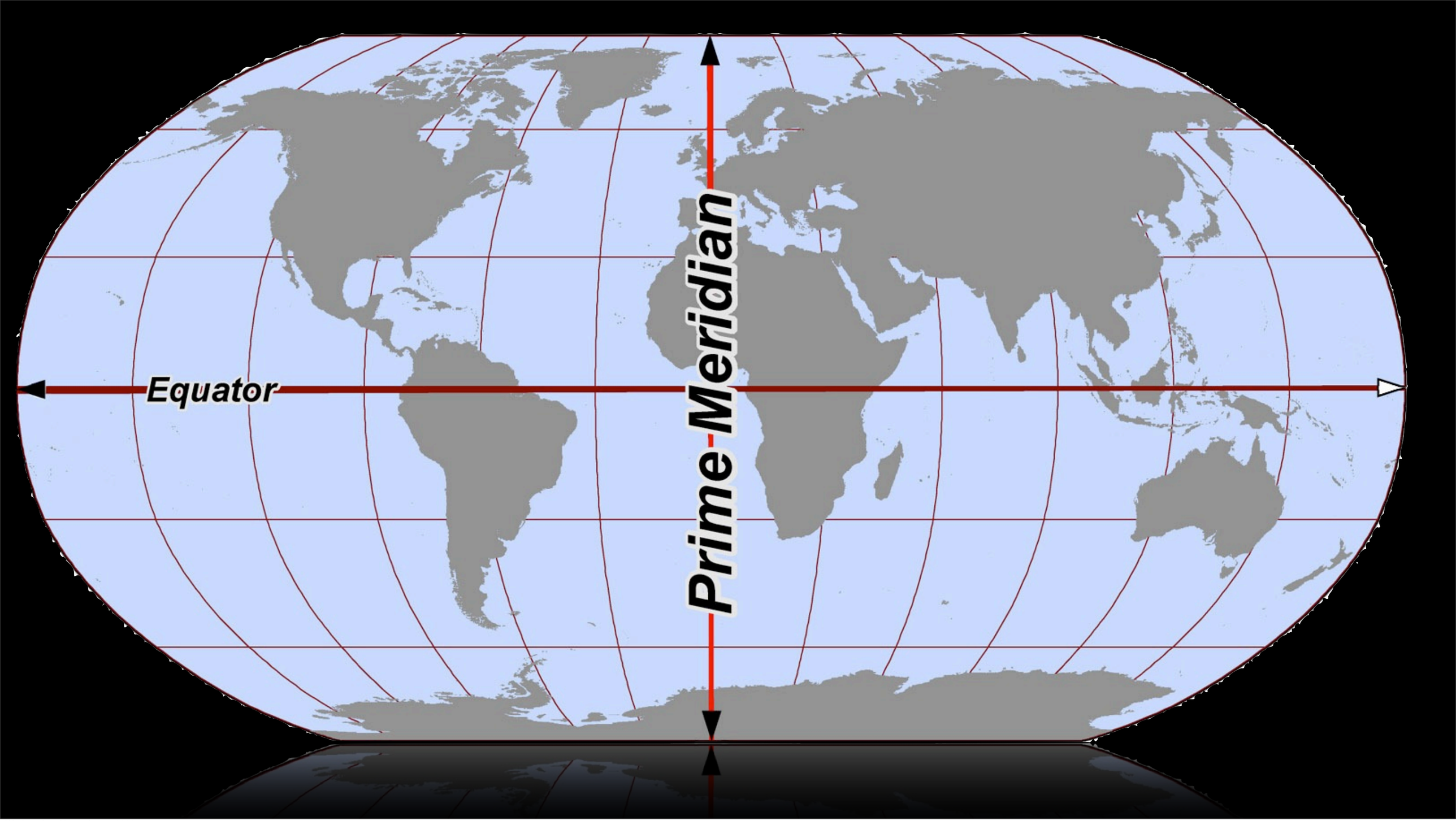
F.Y.R.O.M. - The Former Yugoslav Republic of Macedonia
Greenland (DENMARK)
Jan Mayen (NORWAY)
Greenland Sea
Denmark Strait
Norwegian Sea
Barents Sea
Hammerfest
Tromsø
Murmansk
Kiruna
White Sea
Arkhangel'sk
Reykjavik
ICELAND
Arctic Circle
Luleå
Oulu
NORWAY
Umeå
FINLAND
Lake Onega
Trondheim
Tórshavn
Faroe Islands (DENMARK)
SWEDEN
Gulf of Bothnia
Tampere
Lake Ladoga
SHETLAND ISLANDS
Gävle
Turku
Helsinki
St. Petersburg
Gulf of Finland
Bergen
Oslo
Stockholm
ALAND ISLANDS
Tallinn
ESTONIA
RUSSIA
Rockall (U.K.)
ORKNEY ISLANDS
HEBRIDES
Stavanger
Moscow
North Atlantic Ocean
Aberdeen
Skagerrak
Göteborg
Gotland
Rīga
LATVIA
Baltic Sea
North Sea
Glasgow
Edinburgh
UNITED
DENMARK
Malmö
Oland
LITHUANIA
Vilnius
Vitsyebsk
Smolensk
Belfast
Copenhagen
Kaliningrad
RUSSIA
Mahilyow
Minsk
BELARUS
Isle of Man (U.K.)
Bornholm
Gdańsk
Hrodna
Homyel'
Dublin
Irish Sea
Leeds
Manchester
Liverpool
IRELAND
KINGDOM
Birmingham
Cardiff
Hamburg
Bremen
Berlin
Poznań
Warsaw
POLAND
Brest
Kiev
Amsterdam
NETH.
Rotterdam
London
Łódź
Wrocław
Rivne
Celtic Sea
Essen
Leipzig
Cologne
Brussels
Lille
BEL.
Bonn
GERMANY
Prague
Kraków
L'viv
UKRAINE
English Channel
Guernsey (U.K.)
Jersey (U.K.)
Frankfurt am Main
CZECH REPUBLIC
Brno
Chernivtsi
Mykolayiv
Luxembourg
LUX.
Paris
Stuttgart
SLOVAKIA
Bratislava
Chişinău
Strasbourg
Munich
Vienna
Budapest
Cluj-Napoca
Iaşi
MOLDOVA
Odesa
Nantes
LIECH.
AUSTRIA
HUNGARY
Zürich
Bern
Vaduz
SWITZ.
Geneva
ROMANIA
Bay of Biscay
FRANCE
Ljubljana
Zagreb
Bucharest
Constanţa
Lyon
Milan
Venice
SLOVENIA
Turin
Bordeaux
Belgrade
Varna
Black Sea
Genoa
SAN MARINO
CROATIA
BOSNIA AND HERZEGOVINA
Bilbao
Toulouse
MONACO
Sarajevo
YUGOSLAVIA
BULGARIA
Sofia
Andorra la Vella
Marseille
Ligurian Sea
Florence
Porto
ANDORRA
ITALY
Adriatic Sea
İstanbul
Zaragoza
Corsica
Rome
Skopje
F.Y.R.O.M.



Wednesday, November 4, 2009



Wednesday, November 4, 2009



Wednesday, November 4, 2009

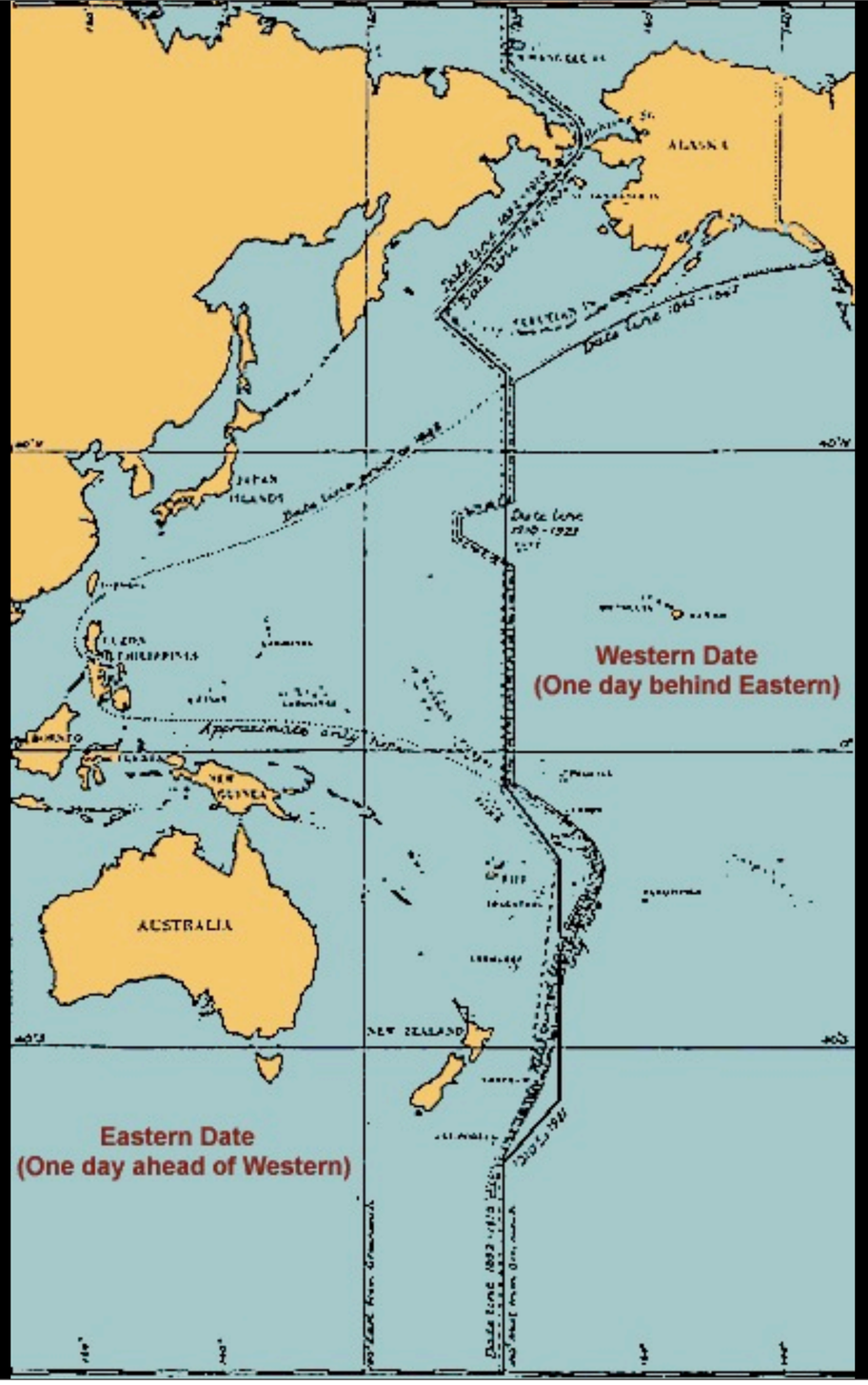
Wednesday, November 4, 2009

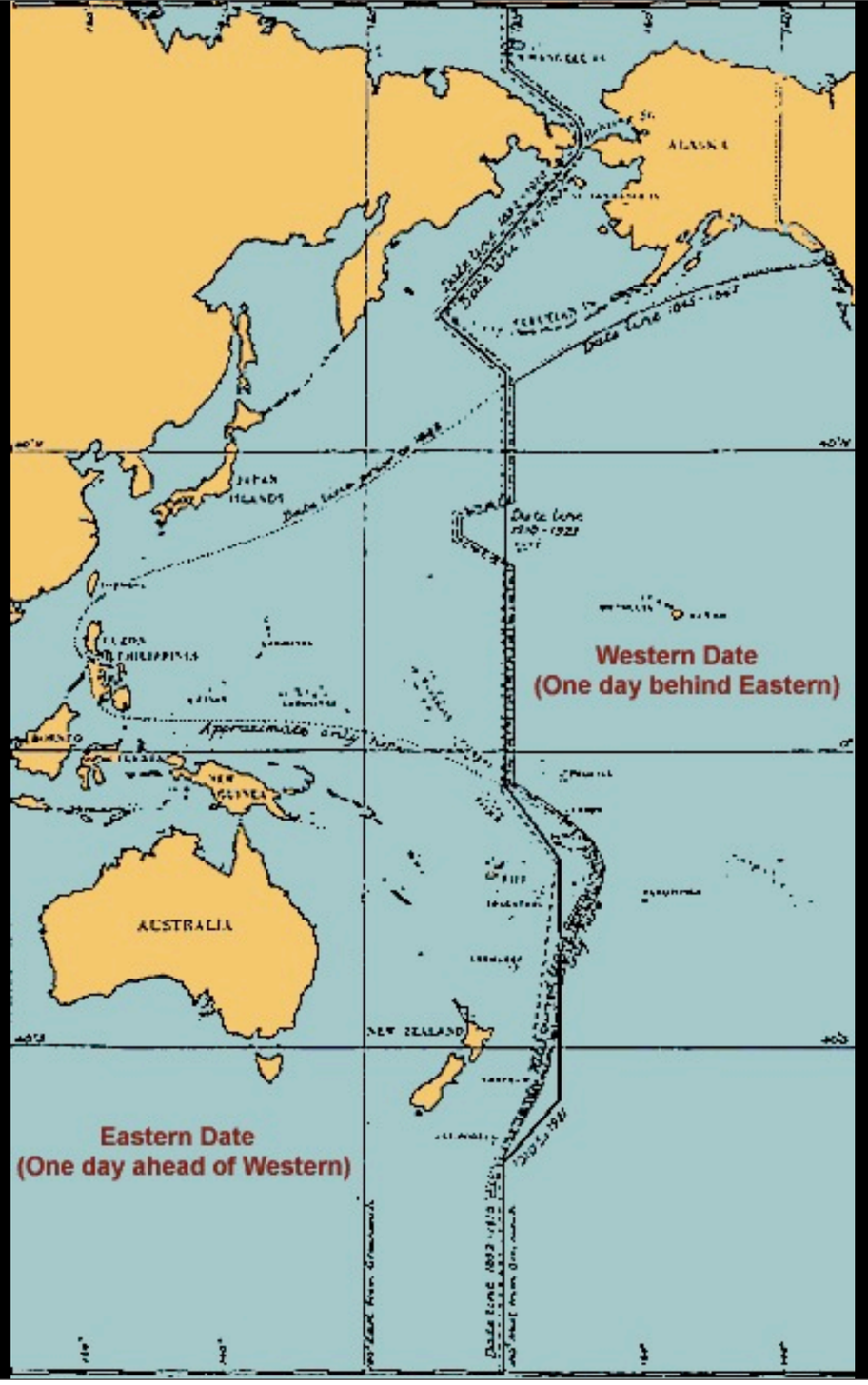
Wednesday, November 4, 2009

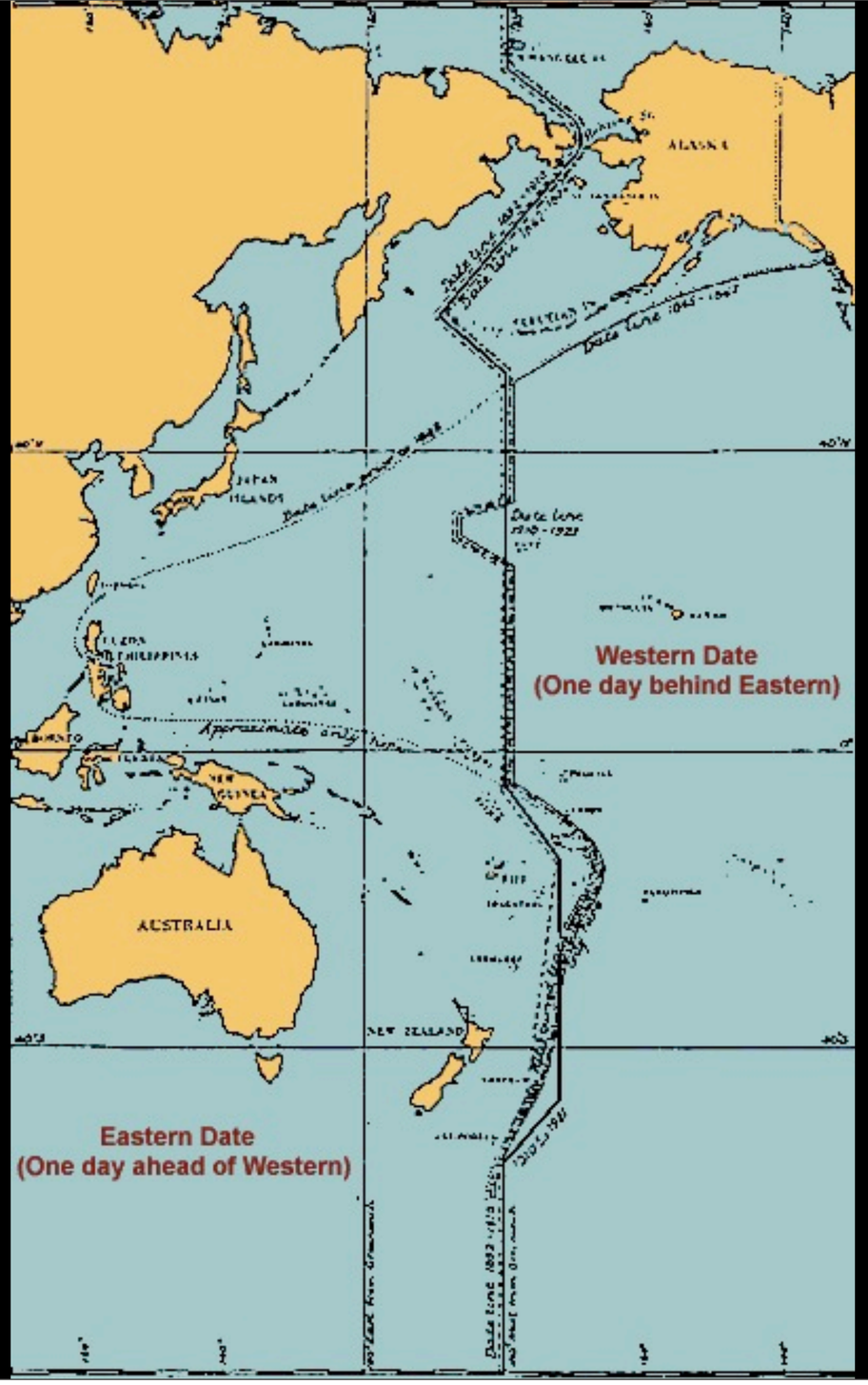
BEI SA BULA - WELCOME TO THE 180° MERIDIAN - TAVEUNI, FIJI ISLANDS
TODAY
WEST
WHERE EACH NEW DAY BE
YESTERDAY
EAST

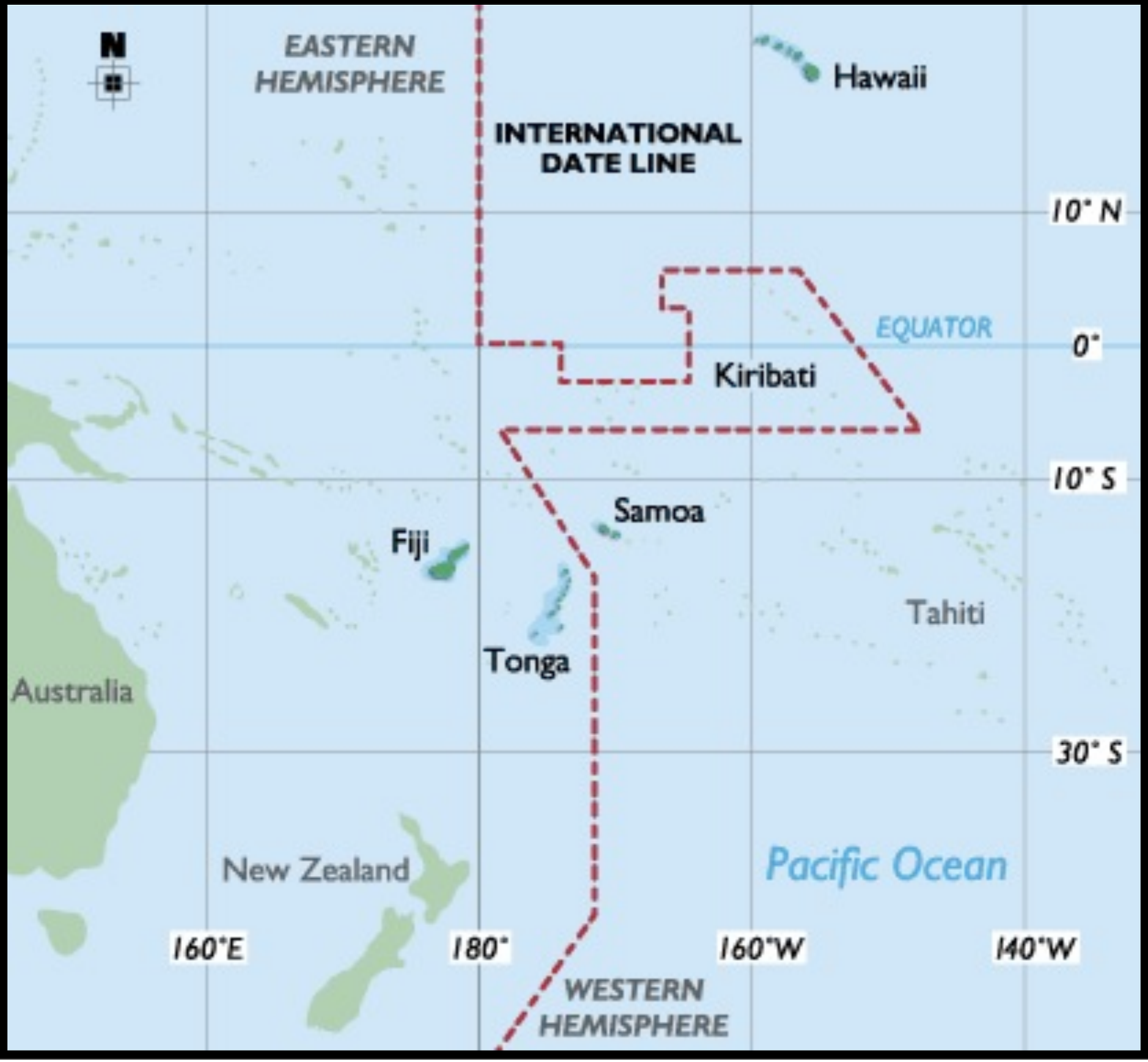
BEI SA BULA - WELCOME TO THE 180° MERIDIAN - TAVEUNI, FIJI ISLANDS
TODAY
WEST
WHERE EACH NEW DAY BE
YESTERDAY
EAST

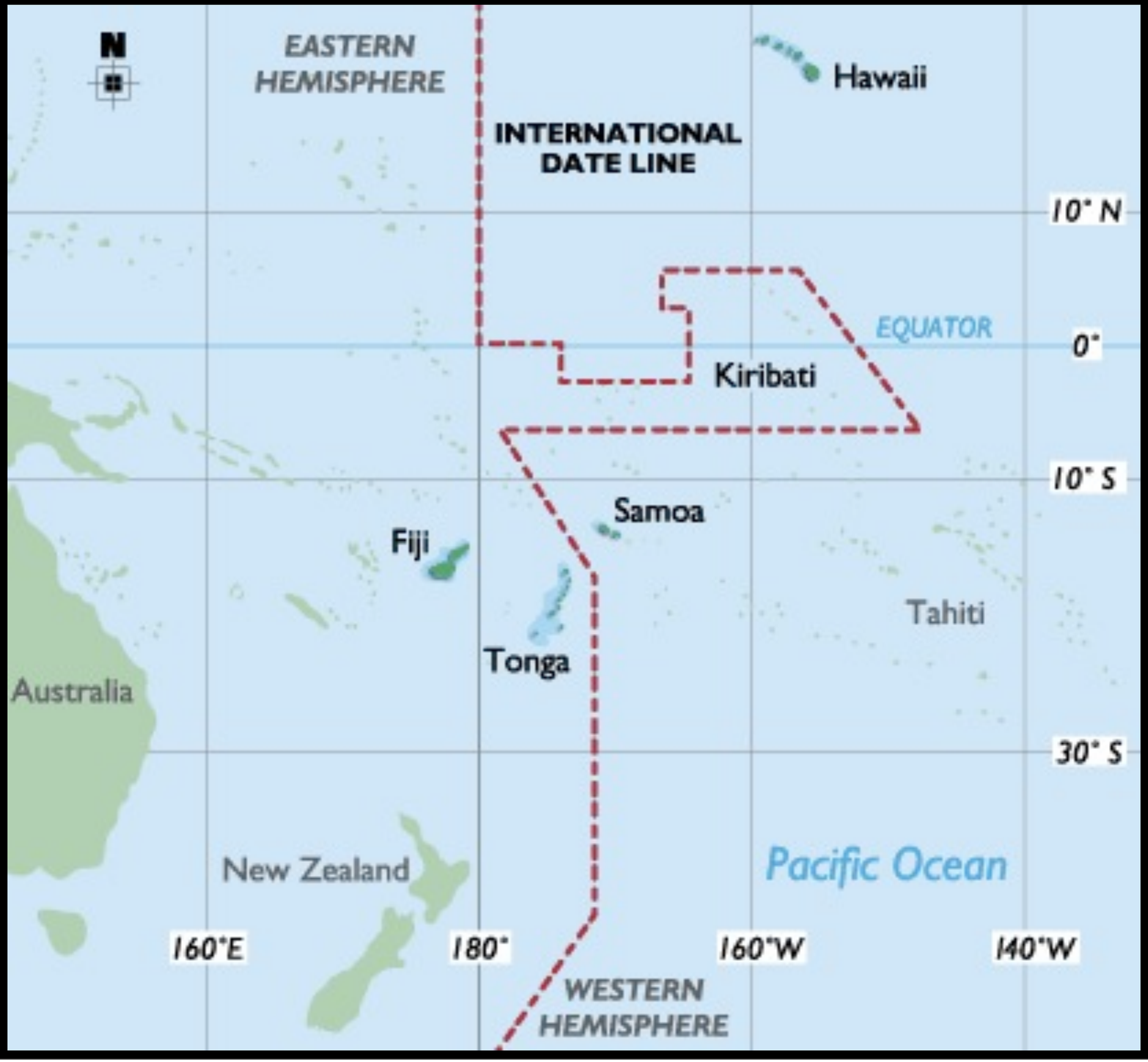
BEI SA BULA - WELCOME TO THE 180° MERIDIAN - TAVEUNI, FIJI ISLANDS
TODAY
WEST
WHERE EACH NEW DAY BE
YESTERDAY
EAST

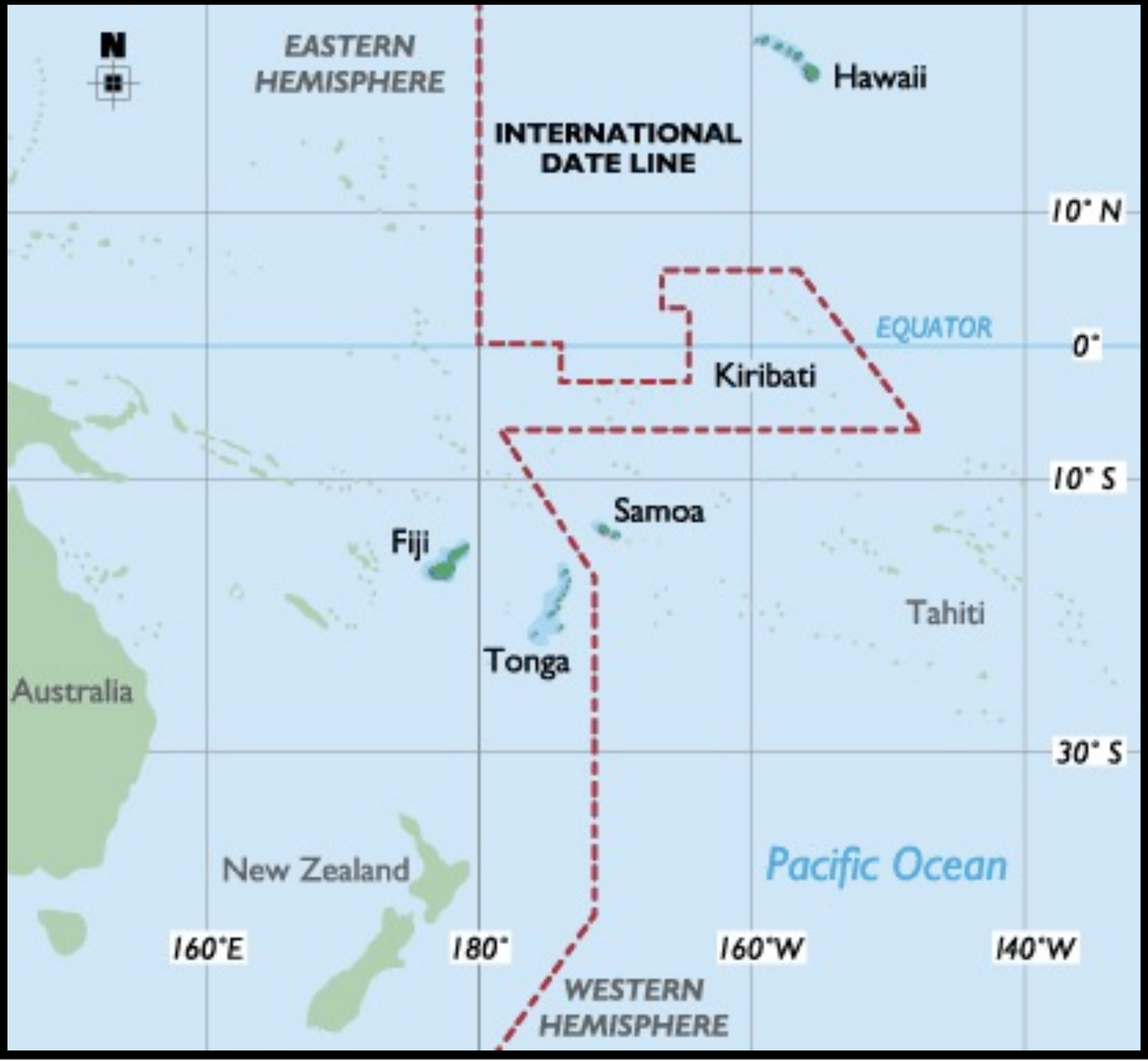

ALASKA
JAPAN ISLANDS
LUZON
PHILIPPINES
BORNEO
NEW GUINEA
AUSTRALIA
NEW ZEALAND
Approximate only here
Western Date
(One day behind Eastern)
Eastern Date
(One day ahead of Western)

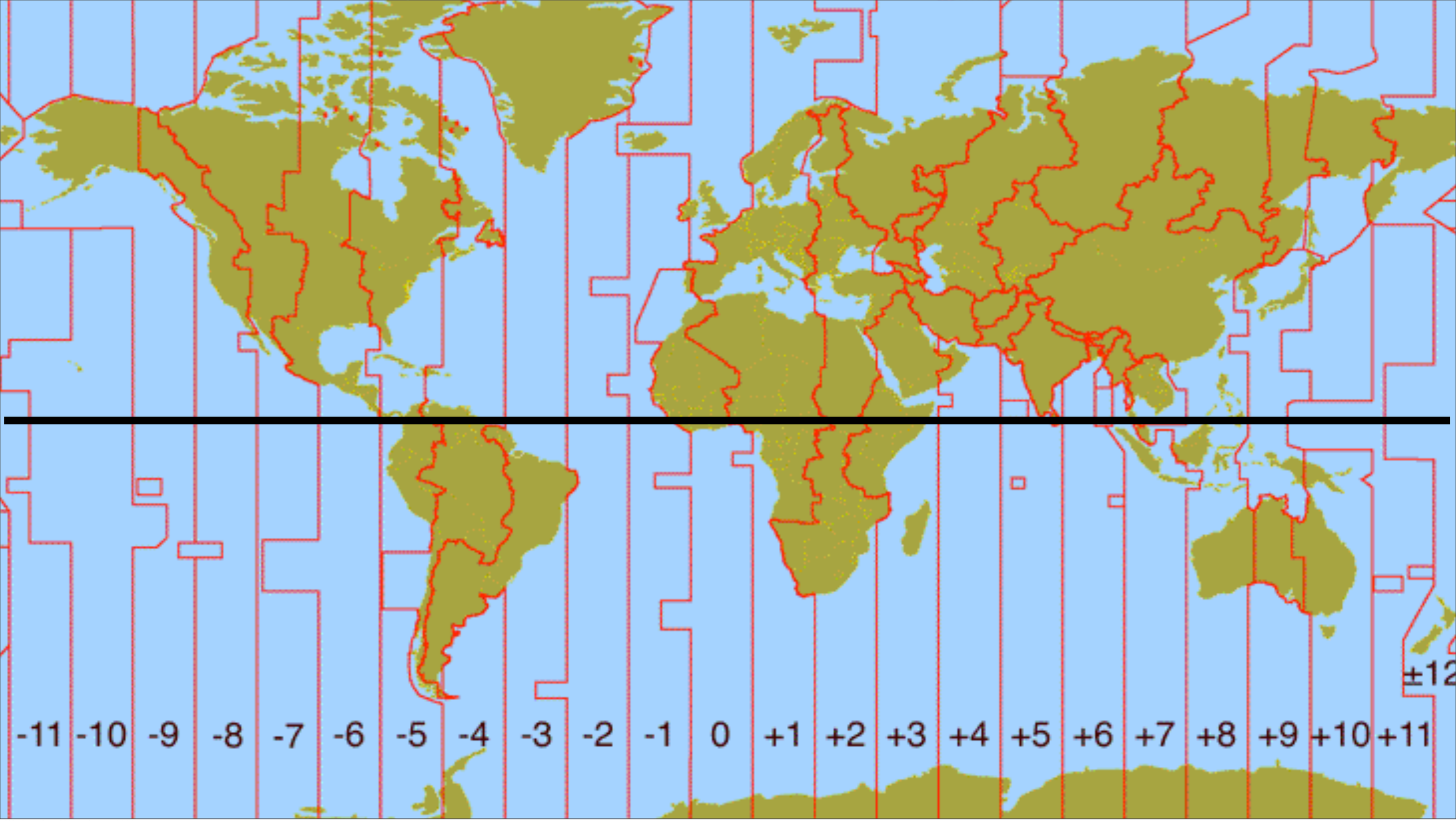

ALASKA
JAPAN ISLANDS
LUZON
PHILIPPINES
BORNEO
NEW GUINEA
AUSTRALIA
NEW ZEALAND
Approximate only here
Western Date
(One day behind Eastern)
Eastern Date
(One day ahead of Western)


ALASKA
JAPAN ISLANDS
LUZON
PHILIPPINES
BORNEO
NEW GUINEA
AUSTRALIA
NEW ZEALAND
Approximate only here
Western Date
(One day behind Eastern)
Eastern Date
(One day ahead of Western)

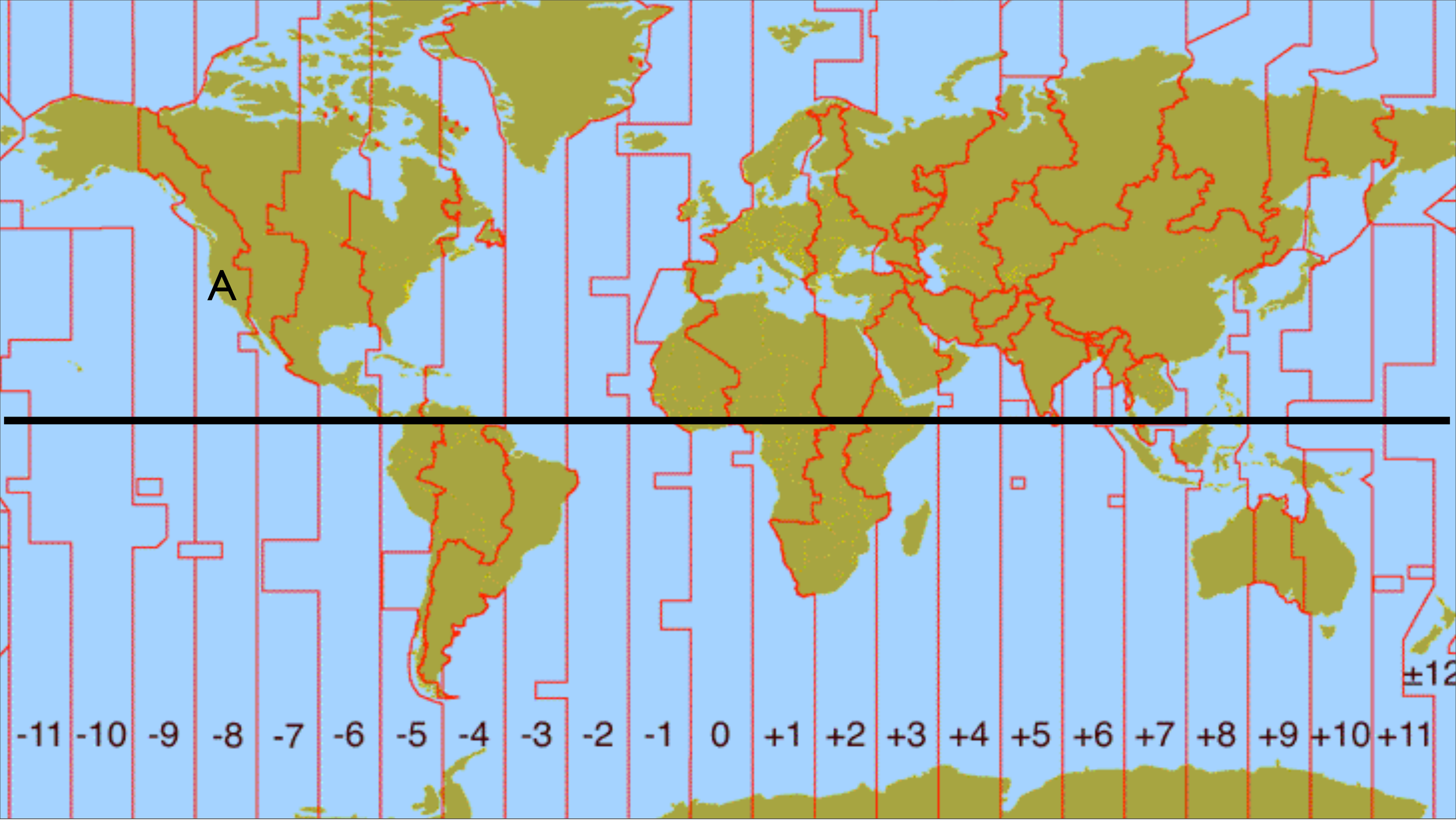

N
EASTERN HEMISPHERE
INTERNATIONAL DATE LINE
Hawaii
10° N
EQUATOR
0°
Kiribati
10° S
Samoa
Fiji
Tahiti
Tonga
Australia
30° S
New Zealand
Pacific Ocean
160°E
180°
160°W
140°W
WESTERN HEMISPHERE


N
EASTERN HEMISPHERE
INTERNATIONAL DATE LINE
Hawaii
10° N
EQUATOR
0°
Kiribati
10° S
Samoa
Fiji
Tahiti
Tonga
Australia
30° S
New Zealand
Pacific Ocean
160°E
180°
160°W
140°W
WESTERN HEMISPHERE

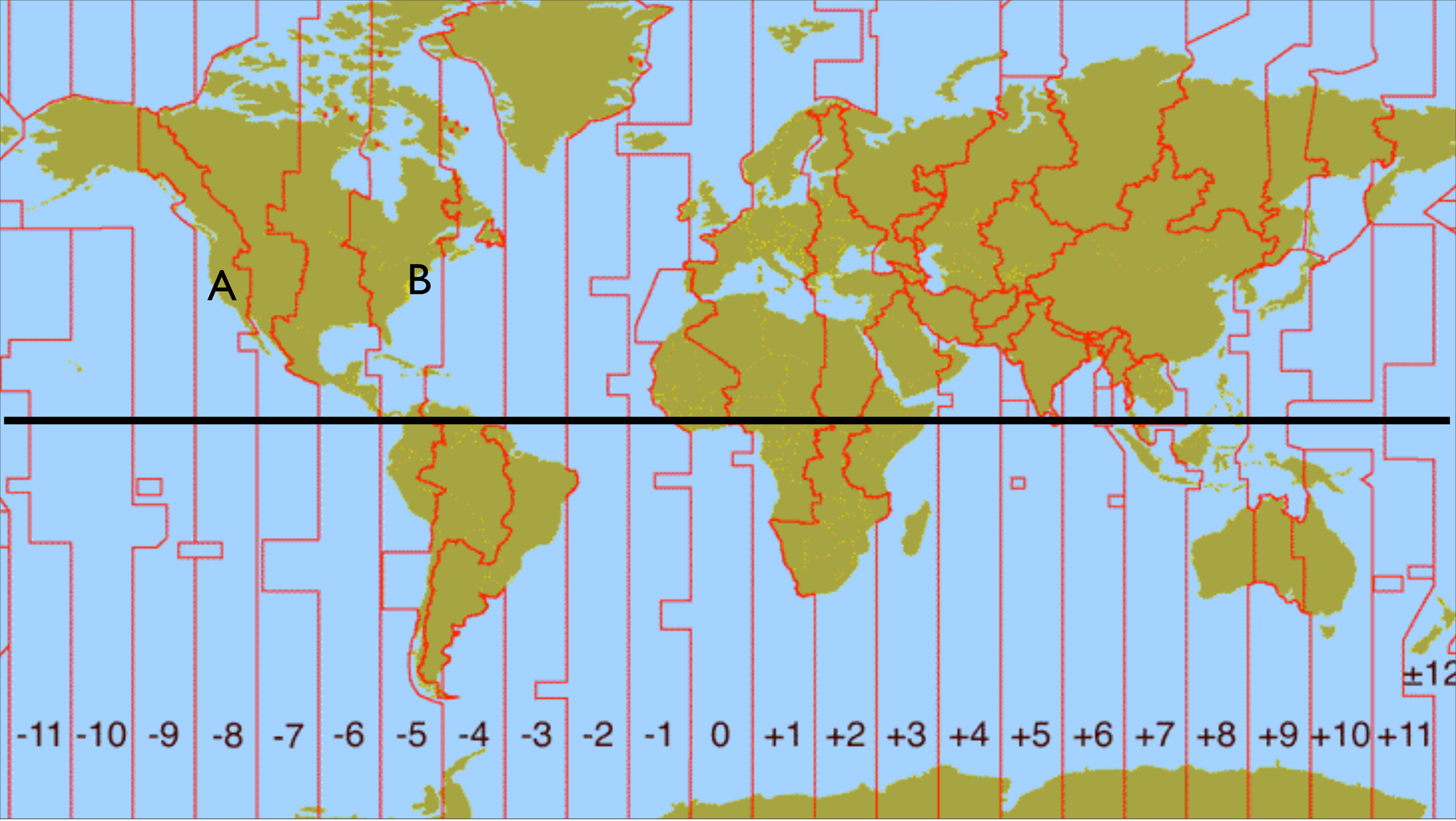

N
EASTERN HEMISPHERE
INTERNATIONAL DATE LINE
Hawaii
10° N
EQUATOR
0°
Kiribati
10° S
Samoa
Fiji
Tahiti
Tonga
Australia
30° S
New Zealand
Pacific Ocean
160°E
180°
160°W
140°W
WESTERN HEMISPHERE



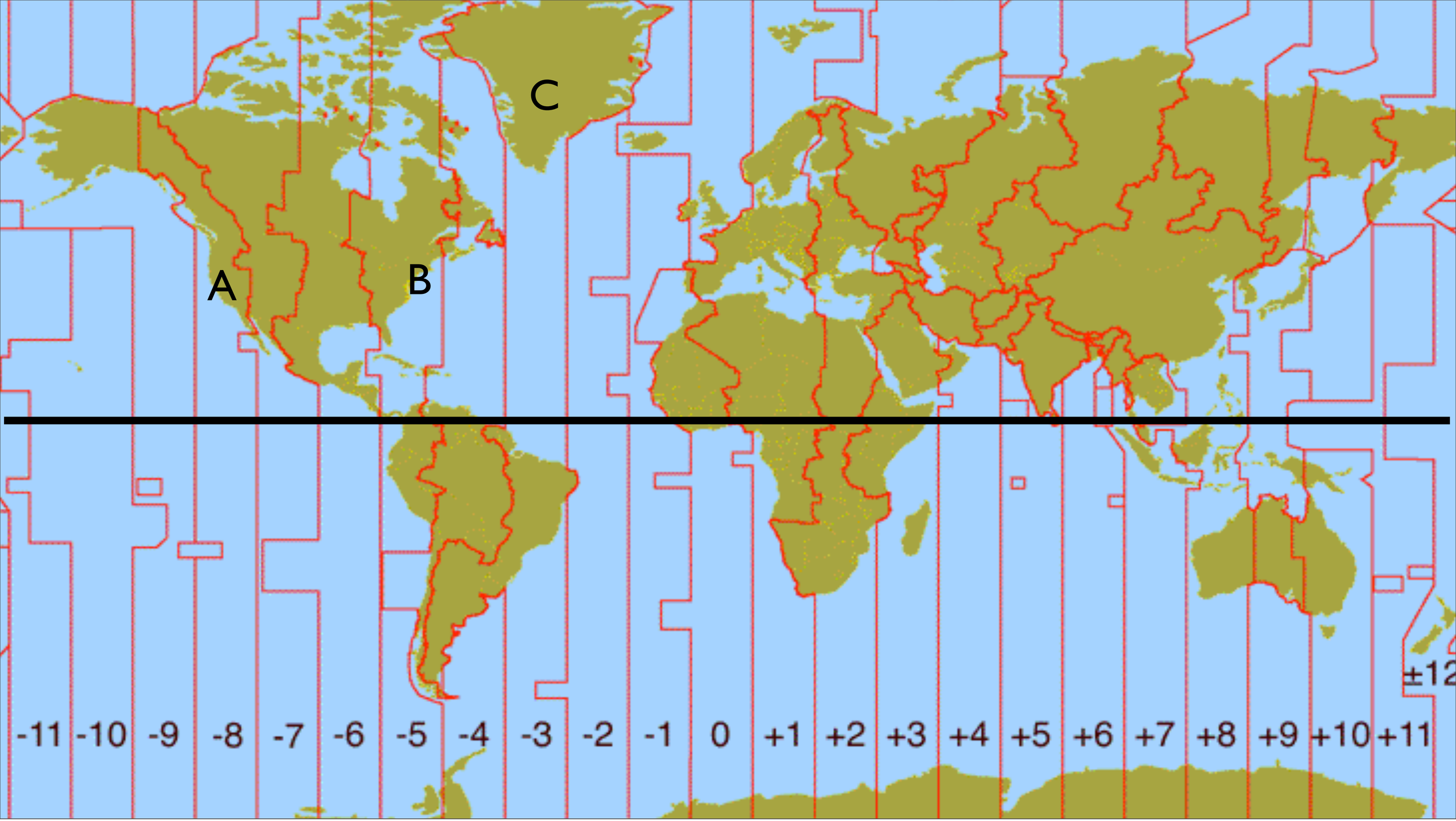
Wednesday, November 4, 2009



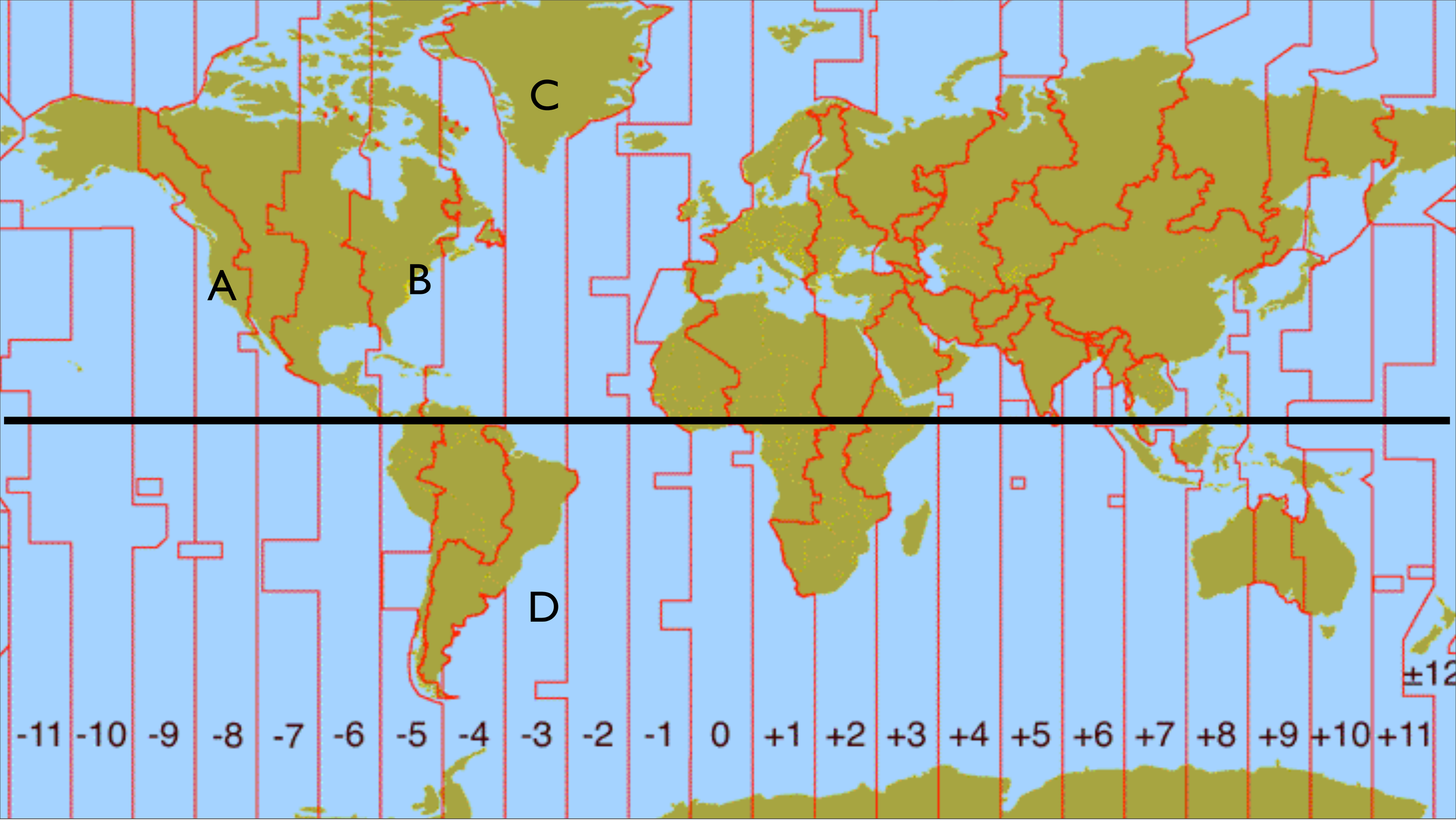
Wednesday, November 4, 2009

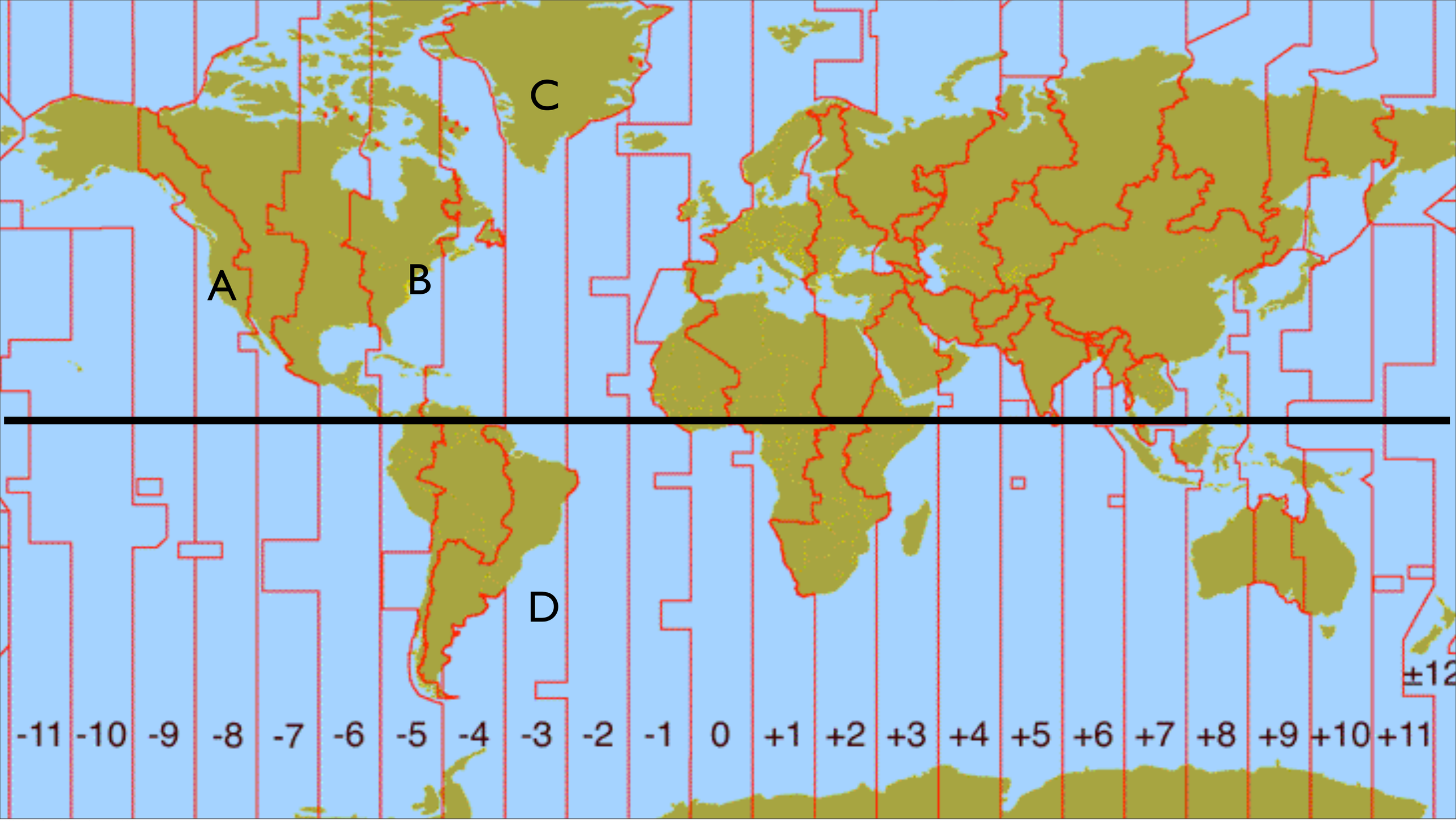


Wednesday, November 4, 2009



Wednesday, November 4, 2009

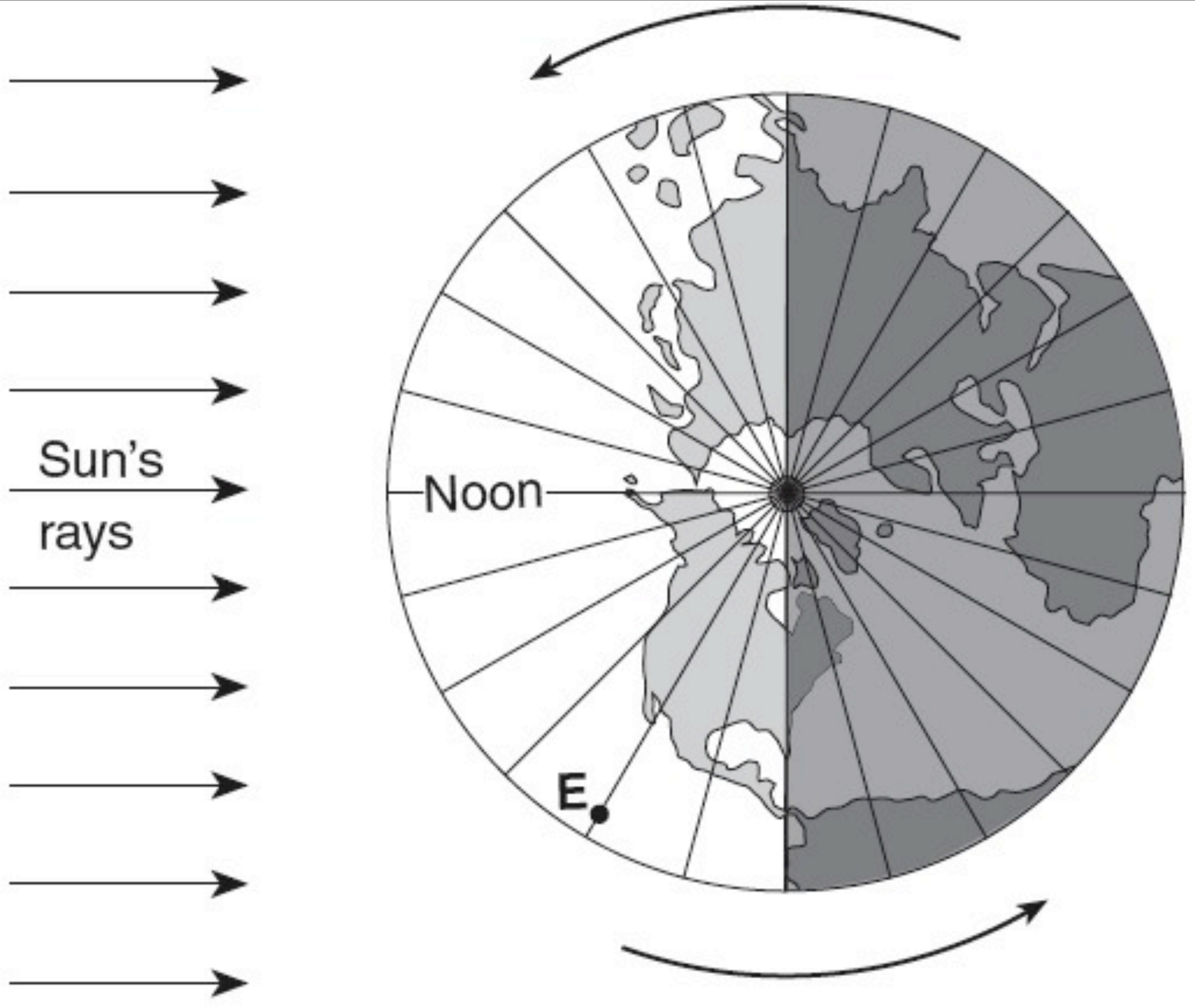

A
B
C
D
-11
-10
-9
-8
-7
-6
-5
-4
-3
-2
-1
0
+1
+2
+3
+4
+5
+6
+7
+8
+9
+10
+11
±12


A
B
C
D
-11
-10
-9
-8
-7
-6
-5
-4
-3
-2
-1
0
+1
+2
+3
+4
+5
+6
+7
+8
+9
+10
+11
±12

Wednesday, November 4, 2009

Wednesday, November 4, 2009

Wednesday, November 4, 2009


Sun's
rays
Noon
E

Your location is 45° West. At the Prime Meridian, the time is 3:00 pm. Your altitude of polaris is 47°. What are your coordinates at this location?