GISGeography

Where is the Central Meridian?

By: GISGeography   Last Updated: October 18, 2023
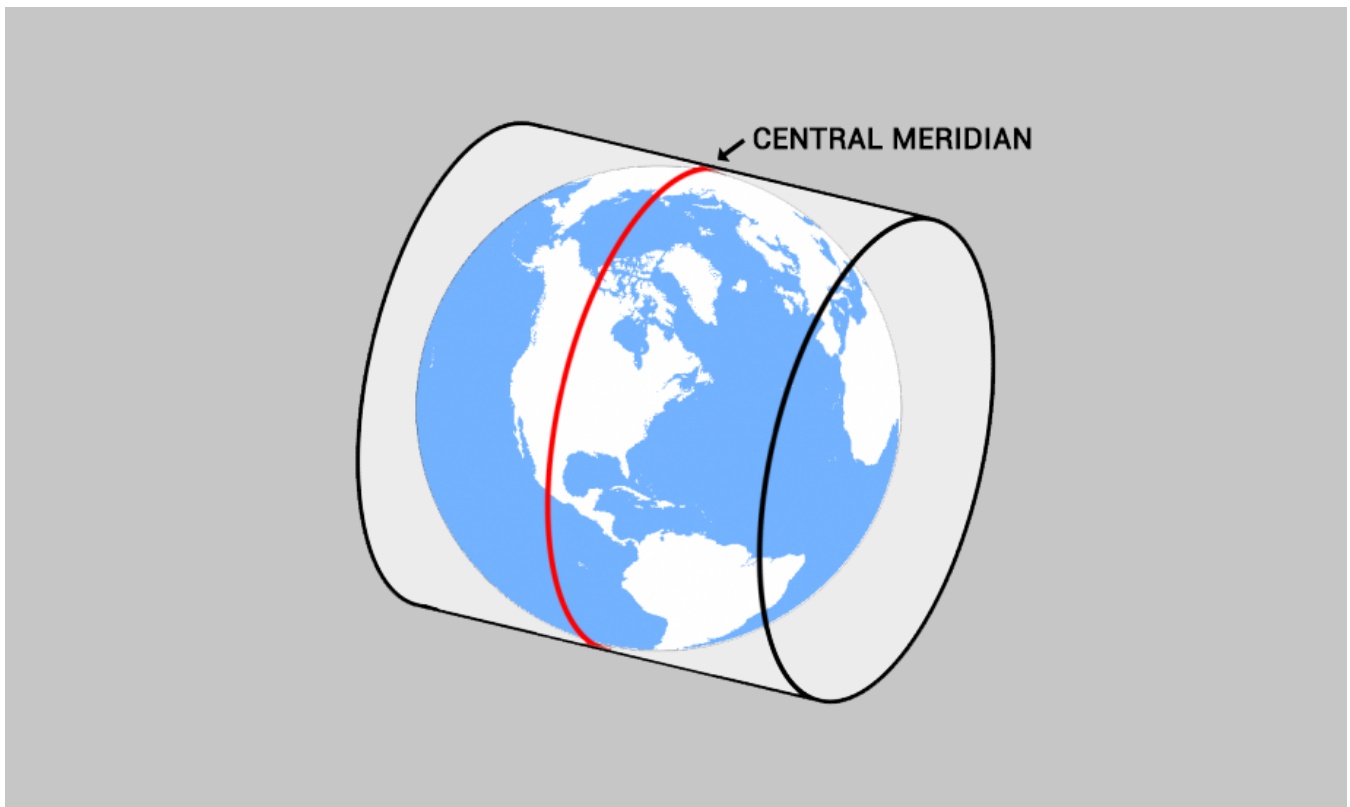
What is the central meridian?

The **central meridian** is the centerline of longitude for projection systems.

Projected coordinate systems often use it as a **reference point for an x-origin**.

For example, the state plane and **UTM projection systems** use a central meridian.

Here are some examples of the central meridian in coordinate systems.

Lines of longitude run north-south

Latitude lines run east-west and are parallel to each other. Whereas **lines of longitude** run north-south and eventually converge at the poles.

For example, the prime meridian is a **line of longitude at 0°**. Everything along this line has a 0° longitude coordinate.

But the **prime meridian (Greenwich meridian)** is specific to 0° longitude. Just like how the equator separates north and south, the Greenwich meridian separates east and west.
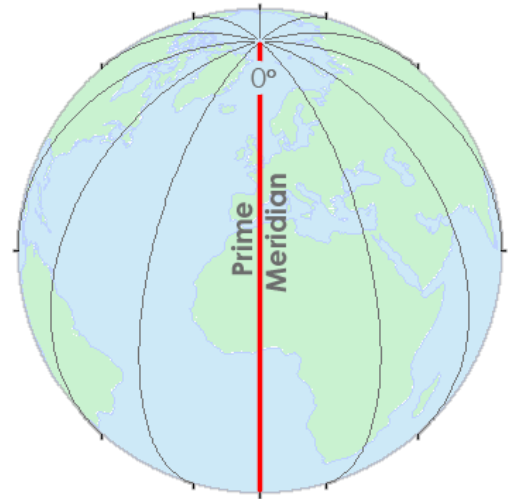
Projection systems use lines of longitude like the prime meridian. Just like how the prime meridian splits east and west, central meridians do the same thing.

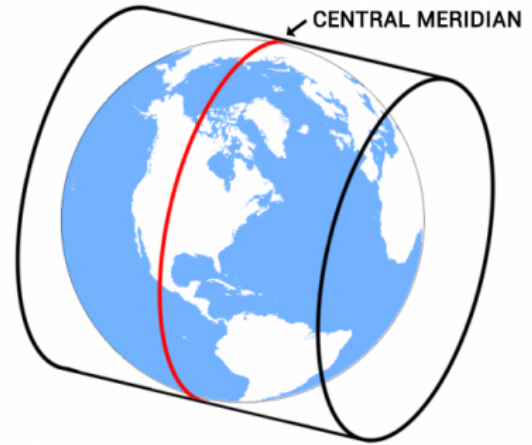# UTM systems use a central meridian

If you move 3° to the east from the prime meridian, this is the central meridian for UTM zone 31. We assign all X-coordinates (eastings) on the central meridian a value of 500,000 m.

This central meridian is an arbitrary value convenient for avoiding any negative easting coordinates. All easting values east and west of the central meridian will be positive.

Each UTM zone is 6° wide. So for UTM zone 31, it ranges from 0°E to 6°E longitude. Then, UTM zone 32 is from 6°E to 12°E with a central meridian of

9°E.

The Transverse Mercator takes a cylinder and places it on its side (rotates it 90°). Then, the cylinder intersects the ellipsoid along with two small circles parallel to the central meridian.


# State Plane Coordinate Systems use a central meridian

Depending on the size and shape of a state, the **State Plane Coordinate System (SPCS)** uses 1 of 3 projection systems:

- Transverse Mercator
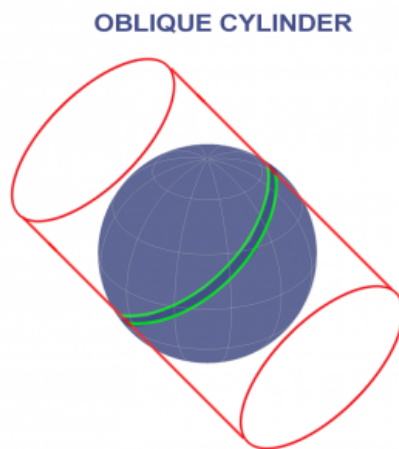- Lambert Conformal Conic
- Hotine Oblique

For zones that are long in the north-south direction, it uses a Transverse Mercator projection. Just like the UTM system, it has a central meridian and two small circles.
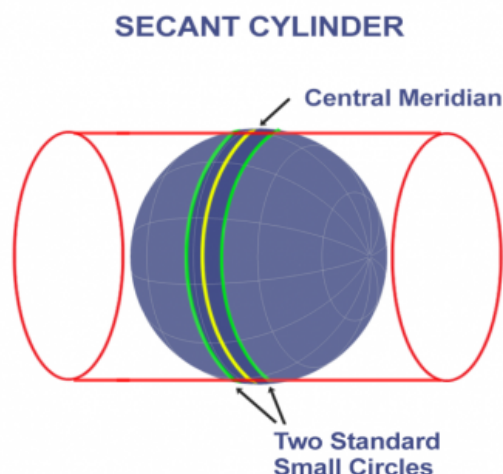
If the zone is long from east to west, SPCS uses the Lambert Conformal Conic projection. This projection uses a secant cone and has two standard parallels.
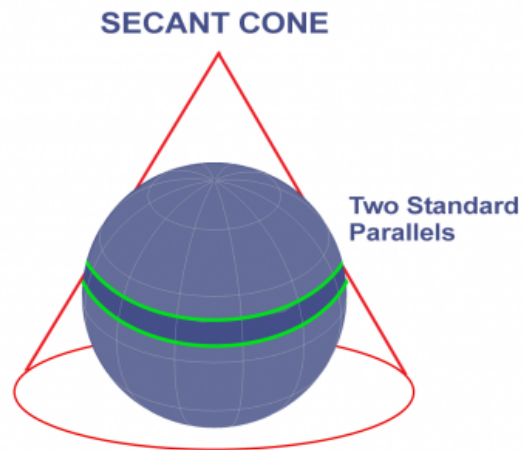
When zones are long in the diagonal direction, the Hotine Oblique projection uses a cylinder at an angle with a central line.

Transverse Mercator, Lambert Conformal Conic, and Hotine Oblique make up the projections for the SPCS.

Where is the central meridian?

The central meridian depends on which projection system you use.

For example, each UTM zone uses the central meridian as an origin for X-coordinates (eastings).

Everything in the central meridian is assigned a value of 500,000 m.

This means that the UTM system has **60 central meridians** for all of its UTM zones.

UTM Zones

Here is a list of all the UTM zones including the central meridian and the extent of the UTM zone.

UTM Zone	Central Meridian	UTM Zone Extent
1	177°W	180°W-174°W
2	171°W	174°W-168°W
3	165°W	168°W-162°W
4	159°W	162°W-156°W
5	153°W	156°W-150°W
6	147°W	150°W-144°W
7	141°W	144°W-138°W
8	135°W	138°W-132°W
9	129°W	132°W-126°W
10	123°W	126°W-120°W
11	117°W	120°W-114°W

12	111°W	114°W-108°W
13	105°W	108°W-102°W
14	99°W	102°W-96°W
15	93°W	96°W-90°W
16	87°W	90°W-84°W
17	81°W	84°W-78°W
18	75°W	78°W-72°W
19	69°W	72°W-66°W
20	63°W	66°W-60°W
21	57°W	60°W-54°W
22	51°W	54°W-48°W
23	45°W	48°W-42°W
24	39°W	42°W-36°W
25	33°W	36°W-30°W
26	27°W	30°W-24°W
27	21°W	24°W-18°W
28	15°W	18°W-12°W
29	9°W	12°W-6°W
30	3°W	6°W-0°
31	3°E	0°-6°E

32	9°E	6°E-12°E
33	15°E	12°E-18°E
34	21°E	18°E-24°E
35	27°E	24°E-30°E
36	33°E	30°E-36°E
37	39°E	36°E-42°E
38	45°E	42°E-48°E
39	51°E	48°E-54°E
40	57°E	54°E-60°E
41	63°E	60°E-66°E
42	69°E	66°E-72°E
43	75°E	72°E-78°E
44	81°E	78°E-84°E
45	87°E	84°E-90°E
46	93°E	90°E-96°E
47	99°E	96°E-102°E
48	105°E	102°E-108°E
49	111°E	108°E-114°E
50	117°E	114°E-120°E
51	123°E	120°E-126°E

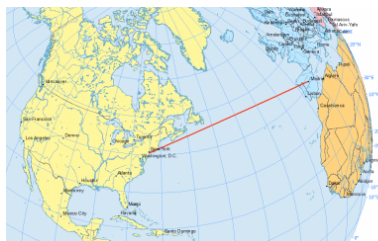| 52	129°E	126°E-132°E
53	135°E	132°E-138°E
54	141°E	138°E-144°E
55	147°E	144°E-150°E
56	153°E	150°E-156°E
57	159°E	156°E-162°E
58	165°E	162°E-168°E
59	171°E	168°E-174°E
60	177°E	174°E-180°E

50 Map Projections Types: A Visual Guide
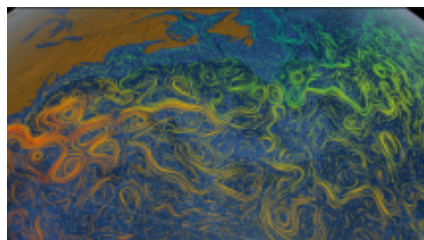
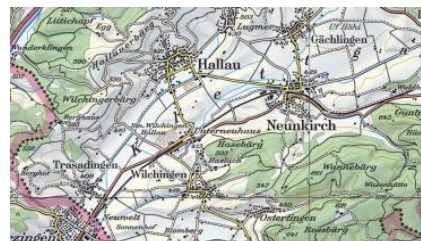**Ocean Currents Map: Visualize Our Oceans Movement**
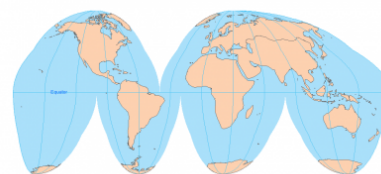
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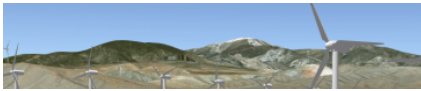

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