## BeiDou Coordinate System

**Responsible Organization:**     China Satellite Navigation Office (CSNO)

**Abbreviated Name:**     BDCS

**Associated TRS:**     ITRS

**Coverage of Frame:**     Global

**Type of Frame:**     3-Dimensional

**Latest Version:**     2019V01

### Brief Description

BDCS is an Earth-centered, Earth-fixed terrestrial reference system. The definition of BDCS is in accordance with the specifications of the International Earth Rotation and Reference System Service (IERS), and its realization is aligned to the latest International Terrestrial Reference System (ITRF). The BDCS (2019V01) is the current solution obtained by adopting more than 100 stations.

### Definition of Frame

**Origin:** Earth's center of mass.

**Axes:**

Z-Axis: The direction of the IERS Reference Pole (IRP).

X-Axis: the intersection of the IERS Reference Meridian (IRM) and the plane passing through the origin and normal to the Z-Axis.

Y-Axis: together with Z-Axis and X-Axis, constitutes a right-handed orthogonal coordinate system.

**Scale:** The length unit is the international system of units (SI) meter.

**Orientation:** Given by the Bureau International de l'Heure (BIH) orientation of 1984.0.

**Time Evolution:** Its time evolution in orientation will create no residual global rotation with regards to the crust.

**Coordinate System:** Cartesian Coordinates (X, Y, Z).

**Defining Parameters:** The geometric center of the BDCS Ellipsoid coincides with the Earth's center of mass, and the rotation axis of the BDCS Ellipsoid is the Z-Axis. The parameters of the BDCS Ellipsoid are shown as follows:

| | |
|---|---|
| Semi-major axis | a= 6378137.0 m |
| Geocentric gravitational constant(including the atmosphere) | $\mu = 3.986004418 \times 10^{14} \, m^3/s^2$ |
| Flattening | f=1/298.257222101 |
| Earth's rotation rate | $\dot{\Omega}_e = 7.2921150 \times 10^{-5} \, rad/s$ |

### Transformation Parameters:

Transformation parameters from BDCS(2019V01) to ITRF2014.

| | Tx (mm) | Ty (mm) | Tz (mm) | Rx (mas) | Ry (mas) | Rz (mas) | Scal (ppb) |
|---|---|---|---|---|---|---|---|
| Estimation | -0.37 | 1.12 | -0.55 | 0.01 | -0.02 | 0.05 | 0.011 |
| STD | 0.74 | 0.74 | 0.74 | 0.03 | 0.03 | 0.04 | 0.012 |