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Consistent Georeferentiation for a Global Spatial Data Infrastructure

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Abstract

The realization of geodetic reference systems on different spatial scales, like global, continental, national, regional, and local is a necessity for different applications. Thanks to geodetic space techniques it is nowadays possible to establish consistency between all spatial scales by the introduction of a hierarchy of geodetic reference systems. The realization of a most precise global reference system depends on accurate measurements which permit the precise definition of origin, orientation and scale of its coordinate system. This is of fundamental importance for all subsequent spatial scales in the hierarchy depending on consistency on this global definition. Therefore the implementation of precise global reference systems relies on a global infrastructure of fundamental stations for geodesy. These are geodetic observatories contributing permanently with complementary and redundant measurements to different international services. Examples for fundamental stations for geodesy are the Fundamental Station Wettzell in Germany and its daughter, the Geodetic Observatory TIGO in Concepción, Chile. They operate all relevant geodetic space techniques together with local sensors at one location in order to monitor geometrical changes in different spatial and time scales. This globally oriented activity is important for georeferentiation throughout all hierarchy levels down to the local spatial scale. Applications like coordinate cadastre at the local spatial scale can be established in consistency with the superior hierarchy levels of geodetic reference systems.
A global spatial data infrastructure benefits from the hierarchy of consistent geodetic reference systems. Fundamental stations of geodesy are therefore also a necessary global infrastructure for a consistent global spatial data infrastructure.