

Theme: GNSS

Mapping the ionosphere using GPS

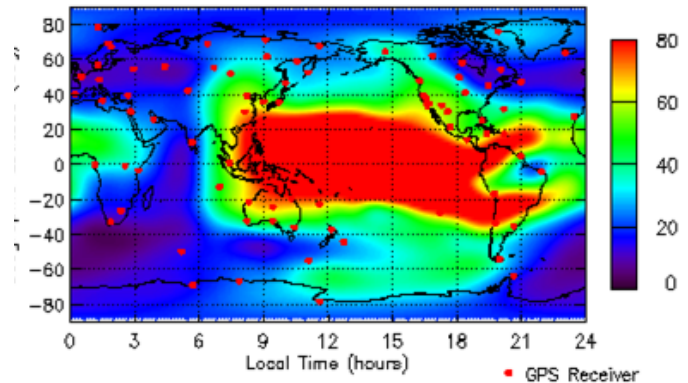
Background

The ionosphere is an ionized region of the atmosphere above 100 km altitude, consisting of several different layers with varying electron density. The ionosphere affects radio communication, as well as satellite navigation, radar remote sensing and radio astronomy measurements.

Severe ionospheric storms, triggered by solar coronal mass ejections, present a big risk for low earth orbiting satellites and power grids on Earth, and can seriously disrupt Global Navigation Satellite Systems (GNSS), such as GPS. Networks of dual frequency GNSS receivers can be used to compute the Total Electron Content (TEC) along the signal path, and thereby monitor the ionospheric activity as part of an international Space Weather Service.

Objective

The objective of this project is to study the variability of the ionosphere using dense networks of GNSS receivers, in particular for radio navigation and radio astronomy applications. Specific attention shall be given to the detection and modeling of so-called Traveling Ionospheric Disturbances (TID). One of the applications that will be considered is the modeling of TEC for correcting GNSS signals (e.g. for automotive positioning) and radar remote sensing (InSAR).



Global Ionospheric TEC map from JPL



Netpos GNSS network (Dutch Cadastre)

Obligatory committee members:

Dr. ir. Hans van der Marel (TU Delft, Geoscience and Remote Sensing)

Information:

- Dr.ir. H. van der Marel (h.vandermarel@tudelft.nl)
Room 2.20