

TEC forecast over Europe



General description

The forecast predicts the total electron content over Europe up to 24 hours in advance also taking into account possible ionospheric perturbation caused by geomagnetic storms.

The underlying empirical TEC storm model is based on identified storm patterns in the ionosphere from 1995 till 2011 over Europe and takes into account seasonal, local time, storm time and latitudinal dependencies. The TEC perturbation amplitude is estimated using an approach based on Dst and solar wind correlations.

The "TEC forecast over Europe" is part of the Forecast System Ionosphere (FSI) developed within the AFFECTS project.

The screenshot displays the SWACI-AFFECTS web interface. On the left is a navigation menu with options: Home, Forecast System, Ionosphere, GNSS based TEC (TEC Europe, TEC Global), Geomagnetic indices, Solar wind data, Vertical sounding, and Early Warning GNSS. The main content area is divided into two sections: 'TEC Europe Observation' and 'TEC Forecast'. The 'TEC Europe Observation' section contains two side-by-side maps of Europe. The left map is titled 'Total Electron Content (TEC)' and the right is 'TEC Rate'. Both maps show a color-coded distribution of TEC values over Europe, with a color scale at the bottom ranging from -10 to 10 TECUm. Below the maps is a legend for 'Ionospheric Range Error (1) : m' with values: 0.00, 1.02, 0.25, 4.05, 0.75, 0.10, 9.72, 11.24, 12.90. The 'TEC Forecast' section features a 60-minute forecast map for 'DLR TEC forecast 60min' on '2013-12-02 09:45:00 UT'. The map shows a grid of TEC values over Europe, with a color scale on the right ranging from 0 to 80 TEC/TECU. The DLR logo is present in the top right of the forecast map. On the right side of the webpage, there is a 'User login' section with fields for 'Username:' and 'Password:', a 'Login' button, and a 'Forgot your password?' link. Below the login section are logos for 'AFFECTS is funded by EU' (European Union flag and logo), 'INSTITUT FÜR ASTROPHYSIK GÖTTINGEN', a five-star rating, 'IKD', 'Fraunhofer IPM', and 'UNIVERSITÄT FROMSO'.

TEC Forecast at the SWACI-AFFECTS webpage

Limitations

The prototype TEC Forecast is now operational. However, the performance under real time conditions and for ionospheric perturbations is subject to ongoing validation and verification work. Therefore future changes and improvements are possible. Please note that the underlying storm statistic of the TEC Forecast is based on single ionospheric storms with quite conditions in the ionosphere before and after arrival of a CME. Therefore two or more strong solar events in short sequence will most probably lead to a significant reduced TEC forecast quality.

Acknowledgements

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Disclaimer

The TEC forecast is created on best efforts basis and is provided "as is" without warranties of any kind. The forecasts issued by the products are accurate to the best knowledge of the developers; however, the developers cannot be held responsible for any damage, loss of profit and similar charges rising out of the use of this product and its output. In particular, the developers of this product cannot be held responsible for the consequences of any action, or the lack of, based on the forecast provided by this product. Any such consequences shall be at sole responsibility of the respective decision makers.

Contact information

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AFFECTS project: <http://www.affects-fp7.eu/>

FSI: <http://swaciwebdevelop.dlr.de/forecast-system-ionosphere/>

TEC Forecast Europe: <http://swaciwebdevelop.dlr.de/gnss-based-tec/tec-europe/>