The design of value added services to serve ESPAS users

Use Case A: Data product search

As opposed to the ESGC use case, this one features a shorter query, as Case A demonstrates the data search functionality. This search is a data product search, where the ESPAS system returns metadata information and download links for data products (Images, Files) that correspond to the query parameters in the FSS’s USER.

Use Case B: Improved techniques for the real-time mapping of ionospheric characteristics

Improved mapping of the ionospheric critical characteristics at the height of maximum density up to high latitudes is important for both HF communication systems and systems relying on ionospheric-sounding parameters, especially under disturbed space weather conditions. The purpose of this case is to find first to use ESPAS ionospheric sounder data from European high latitudes to expand the use of CMAT currently provided in ESPAS, and second to assess the potential of ESPAS to provide these maps as a value added service in real-time.

The data maps are produced based on the DIAMS and DIMM models analysing ionospheric parameters calulated in real time from B-mid-latitude observations. For this purpose ESPAS, data from the additional stations can be used. To select maps through the SED database and Sonolab database (SBD). The process has been automated getting new datasets directly from the data provider and only map the region above 60 deg N, while in the database (SBD) a buffer cone between 60 and 80 deg is implemented in case a request is applied. The new algorithm is running in CMAT and returning the first products by ESPAS in real-time is possible at a frequency specified by the service provider.

Use Case C: Validation of physical model data assimilation system

Explanation of the ESPAS data infrastructure through use of an experimental case, in which the Coupled Middle Atmosphere Thermosphere Co-simulation model (CMAT2) and its assimilation system for an extended period of several weeks. Herein ESPAS data types retrieve those already used by the assimilation system, the objective is to use the independent benchmark data for direct validation. CMAT2 has been run as a part of BESSIE on 23 December 2010 through to 2 February 2011 using assimilated 3-hourly values of v and w for the period. The test set as external forcings to CMAT2, which is a running forecast assimilating at this stage. The low-sun activity represents the neutral atmosphere provided by the Bremen-Potsdam ionospheric (FPI) dataset through ESPAS. Espas is compared against the model thermospheric and neutral winds.