Goal and Usage of the HPF Level 2 XML parser

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Abstract

All GOCE level 2 products archived and distributed by ESA to the GOCE user community are written in Earth Explorer File (EEF) format. The EEF format is based on XML. A XML parser is needed to transform these EEF products to format used by existing software.

The XML parser is developed by the GOCE High-Level Processing Facility (HPF) - under ESA contract.

Level 2 XML Parser Usage

All GOCE level 2 products are available to the user community via the ESA GOCE user service interface. The products are provided in XML format in order to enhance the products readability and the in-file data definitions. However, many existing software used by the GOCE user community expects input in a native format. For this the HPF level 2 XML parser becomes handy, it transforms the XML formatted products in to these native formats.

Prerequisites

- Perl (version 5.8 and higher)
- Required Perl modules: *Getopt::Long, File::Basename, XML::Parser, XML::LibXML, XML::LibXSLT, MIME::Base64*
- Successfully tested on the following platforms: Linux, Windows and Mac OS X

Product Name	Product Definition	Native Format
EGG_NOM_2	Level 2 gravity gradients (GRF) ▪ Externally calibrated and corrected gravity gradients ▪ Corrections to gravity gradients due to temporal gravity variations ▪ Flags for outliers, fill-in gravity gradients for data gaps with flags ▪ Gravity gradients error estimates	GG (time)
EGG_TRF_2	Level 2 gravity gradients (LNOF) ▪ External calibrated gravity gradients in local north oriented frame ▪ Corrections to gravity gradients due to temporal gravity variations ▪ Flags for outliers, fill-in gravity gradients for data gaps with flags ▪ Gravity gradients error estimates	GG (spatial)
SST_PSO_2	Precise science orbits ▪ Reduced-dynamic and kinematic precise science orbits ▪ Rotation matrices between IRF and EFRF ▪ Variance-covariance information of kinematic positions ▪ Quality report for precise orbits	SP3c Rotation Matrix Covariance PDF
EGM_GOC_2	Final GOCE gravity field model ▪ Spherical harmonic series including error estimates ▪ Grids of geoid heights, gravity anomalies and deflections of vertical ▪ Propagated error estimates in terms of geoid heights ▪ Quality report for GOCE gravity model	ICGE Grid Grid PDF
SST_AUX_2	Time variable gravity field due to non-tidal mass variations ▪ 6-Hourly time series of gravity field spherical harmonic series	ICGEM

Documentation

- XML parser documentation, included with the GOCE HPF L2 XML parser software
- GOCE Level 2 Product Data Handbook (http://earth.esa.int/GOCE/)
- GOCE Standards (http://earth.esa.int/GOCE/)

Performance

The performance of the L2 XML parser, listed below, is just an indication of how fast a typical L2 product can be transformed. The actual values heavily depend on the speed, cache and RAM of the computer used.

Hardware used: Intel Xeon E5530 (2.40GHz, 8MB Cache) with 6GB RAM

Product	EEF size	Result size	CPU time
SST_PSO_2	450 MB	120 MB	17m30s
SST_AUX_2	950 kB	300 kB	0m4.0s
EGG_NOM_2	240 MB	65 MB	5m3.5s
EGG_TRF_2	2,550 MB	675 MB	53m32s
EGM_GOC_2	62 MB	23 MB	3m5.0s

ESA's gravity mission GOCE

The 'Gravity field and steady-state Ocean Circulation Explorer' (GOCE) satellite, launched in March, will map Earth's gravity field with unprecedented accuracy, providing insight into ocean circulation, sea-level change, climate change, volcanism and earthquakes.

European GOCE Gravity consortium (EGG-c)

The EGG-c was established in 2000 with the aim of performing the processing of the GOCE measurements in to the gravity field products. It is a collaboration between 10 European institutes.

GOCE High-level Processing Facility

The HPF is part of the GOCE ground-segment and is developed under ESA contract by the EGG-c. The HPF is set up as a distributed facility consisting of several sub-processing facilities (SPF) for scientific pre-processing, orbit determination, gravity field analysis and validation.