

Atmospheric Effects Topical Group

Reporting period: 2011 – June 2012

1. ATMOP

2. ESA GOCE+ theme 3: density and winds

ATMOP

Advanced Thermosphere Modelling for Orbit Prediction

Space Call 3 – FP7-SPACE-2010-1

<http://www.atmop.eu/>

ATMOP Work package 4: ***Semi-empirical modelling of the thermosphere***

The DTM2012 semi-empirical thermosphere model has been constructed these last months. This is an intermediate model in the development of DTM2013, which will be developed using new geomagnetic indices.

DTM2012 is an update (essentially fitted to a larger data base) of DTM2009, which model is evaluated in the following paper (free):

« Evaluation of the DTM-2009 thermosphere model for benchmarking purposes »

<http://www.swsc-journal.org> (vol. 2)

DTM2012 will be released in September via the website
<http://www.atmop.eu/model.php>

Model coefficients have been estimated, presently we are working on a user-friendly package.

The following data sets are assimilated in DTM2012:

- ✓ CHAMP 2001-2010
- ✓ GRACE 2003-2010
- ✓ Starlette & Stella 1994-2010
- ✓ Deimos-1 3/2010-9/2011
- ✓ CACTUS 7/1975-1/1979
- ✓ DE-2 (T, He, O, N₂) 8/1981-2/1983
- ✓ AE-C (N₂) 1/1974-4/1977
- ✓ AE-E (T, He, O) 12/1975-5/1981
- **Not yet (for DTM2013): OGO6, GOCE, GRACE 2011-2012**

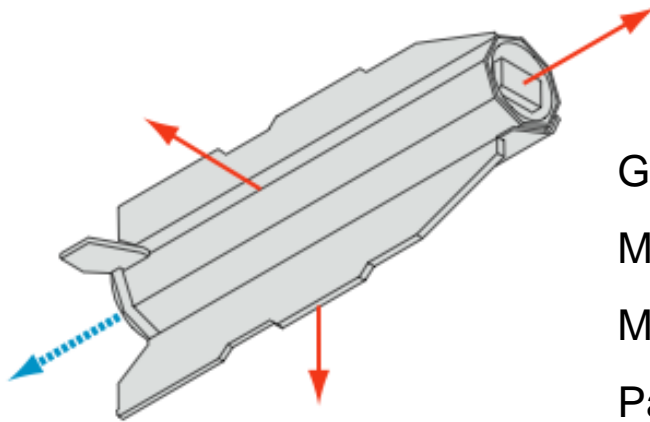
ESA GOCE+ theme 3: density and winds

Proposal in response to

ESA AO/1-6367/10/NL/AF

<http://thermosphere.tudelft.nl/goceplustheme3/>

“GOCE+ Theme 3: Air density and wind retrieval using GOCE data”



GOCE Launch:	17 mars 2009 de Plesetsk
Mission objectives:	High-resolution gravity field of the Earth
Mission orbit:	Sun-synchronous, dawn/dusk, at 255 km
Payload:	Gradiometer (accelerometers), GPS
Drag control:	Ion thrusters commanded in closed-loop

TU Delft, The Netherlands
CNES, France
HTG, Germany

project KO: March 2011

GOCE thruster data from November 2009 through September 2011 has been processed.

- Densities are still preliminary due to satellite model issues (possibly causing a bias in the densities)
- Densities reveal significant model errors (latitude structure)
- The first wind results look promising

- **GOCE mission extended to end-of-life (summer-fall 2013);**
- **Mission altitude will be lowered to 250 km in August, and 240-245 in December;**
- **Mission altitude will be raised again in 2013**
- **First density and wind products expected by the end of this year (please check website).**