**A joint ESA-CNES project, to make easier the use of altimetry**

The Basic Radar Altimetry Toolbox is an "all-altimeter" collection of tools, tutorials and documents designed to facilitate the use of altimetry data, from most missions since 1991, for all applications.

**read most distributed altimetry data**

- Topex/Poseidon
- ERS-1
- ERS-2
- Envisat
- CryoSat
- SeaWinds
- GFO

**process & select data**

- Along-track SLA and SSH from Envisat GDRs

**visualize & export the results**

- Various possible graphic outputs
- Editing of invalid data
- Geostrophic velocities computation

The Radar Altimetry Tutorial gives general information about altimetry, the techniques involved and their applications, as well as an overview of the missions. It also presents a series of data use cases, covering all uses of altimetry over ocean, cryosphere and land, showing the basic methods for some of the most frequent manners of using altimetry data.

BRAT is developed under contract with ESA and CNES. [http://www.altimetry.info](http://www.altimetry.info) and [http://earth.esa.int/brat/](http://earth.esa.int/brat/)

**Data Use Cases: geodesy applications – using GOCE User Toolbox and BRAT**

Geodesy is historically one of the first applications of satellite radar altimetry. Now that the precision of the measurements enable to reach ocean mesoscale variation amplitude, the point is more to have external knowledge of the geoid in order to access ocean circulation parameters – like the Mean Dynamic Topography. Thus the GOCE User Toolbox (GUT) was designed from start to be compatible with the Basic Radar Altimetry Toolbox (BRAT).

The Basic Radar Altimetry Toolbox is interoperable with the GOCE User Toolbox several ways:

- The GUT "viewer" is BRAT's (that can work independently from the main software)
- GUT output data can be read by BRAT
- and vice-versa , some BRAT output (e.g. SLAs, along-track or gridded) can be read and used by GUT

**Detailed examples on the web site**

("Data Use Cases") [http://www.altimetry.info](http://www.altimetry.info)

Three steps of the computation of a Mean Dynamic Topography using the GOCE User Toolbox, from an a priori Mean Sea Surface and GOCE spherical harmonics data

Mean Dynamic Topography = Mean Sea Surface - Geoid height

Top left, (first step), a geoid computed using the GOCE spherical harmonics data (over the whole globe)

Bottom middle (last step), the resulting Mean Dynamic Topography after resampling, land mask and filtering (here the filter is ± 2 degrees, with the final GOCE data, a resolution of 1 degree will be possible).

This Mean Dynamic Topography can then be used to compute Absolute Dynamic Topography by adding it to altimetry Sea level Anomalies

**BRAT can be used several ways in combination with GUT**

For example:

- to compute SLA, either from GDRs or from higher level datasets, along-track or gridded, or extract them from pre-computed datasets
- to compute geostrophic velocities, and plot them (coming soon in version 3)
- to compute Kinetic energy from those (or from similar GUT outputs)
- to overlay on other altimetry data or data available within altimetry datasets (e.g. bathymetry)
- to select relevant data (editing in particular) by using thresholds, or flag values, etc.