The PISTACH project (funded by CNES as part of Jason-2 project to improve satellite radar altimetry products over coastal areas and continental waters) is organized around 3 phases:

**Phase 1 (Nov 2007 → March 2008):** user needs and structure of coastal/hydrological products

**Phase 2 (Nov 2007 → July 2008):** Development of new dedicated algorithms: retracking of the waveforms, wet and dry tropospheric corrections, local models or high resolution global models for topography, geoid, land cover classification, land water mask, data editing

**Phase 3 (July 2008 → Sept 2009):** prototype implementation, validation and operations during Jason-2 CalVal phases

The input of the prototype is constituted by Jason-2 Level 2 S-IGDR altimeter products, ECMWF meteo fields, as well as several state of the art static auxiliary datasets (DEM, geoid, ...) The first version of PISTACH products adopts the same format and structure as Jason-2 standard I-GDR. The input of the prototype is constituted by Jason-2 Level 2 S-IGDR altimeter products, ECMWF meteo fields, as well as several state of the art static auxiliary datasets (DEM, geoid, ...) The first version of PISTACH products adopts the same format and structure as Jason-2 standard I-GDR.

The wet and dry tropospheric corrections are recomputed from ECMWF 3D meteo fields with the bottom (and thus thickness) of the atmosphere column given by each altimetric measurement.

**EOPHYSICAL CORRECTIONS - LOCAL MODELS**

The PISTACH products include several state of the art geophysical corrections as well as higher resolution global/local models, in addition to the content of standard Jason-2 I-GDR:

- **Tides:** GOT 4.7 (Ray)
- **UFO-TG:** regional models from LEGOS (TBC)
- **MSS:** GODCSV on the North Atlantic
- **Bathymetry:** MEG/E-ETOPO2V2 (US coasts), ETOPO2V2 (Black and Baltic seas)
- **Web Tide:** (NW Atlantic, Hudson Bay)
- **Geoid:** EGM2008
- **DAC:** Global solutions from ECMWF
- **MTD:** regional models from LEGOS (TBC)
- **DEM:** SRTM3_CLS to be replaced by ACE2 (3''arc)
- **Land Cover Class:** GLC_COVER (10''arc)
- **Land/Water Mask:** IBD/HyBm
- **Distance to Shoreline**

**WET TROPOSPHERIC CORRECTION (Coastal Oceans)**

2 different wet tropo corrections are implemented in the PISTACH prototype for the coastal oceans:

- **Composite correction**
  - the model correction (ECMWF) replaces the radiometer near the coast (-150 km).
  - simple case: “transmission” ECMWF corr. is shifted at the nearest valid radiometer corr.
  - more complicated cases: idem + interpolation and dephasing of the ECMWF corr.

- **Decontamination correction**
  - \( TB_{corr}(f) = TB(f) - corr(TB_{corr}(f)) \)
  - \( p(f) \) is the land proportion in the pixel (taking into account the antenna pattern)

**WAVEFORM RETRACKING**

Altimeter echoes (waveforms) are highly perturbed by emerged lands wet open ocean returns and thus require a dedicated retracking strategy.

Within PISTACH, the retracking is organized around the following steps:

- **Classification of the waveforms**
- Filtering of the waveforms (before MLE4 retracking)
- Application of 4 different retracking algorithms:
  - 1st: position of the center of gravity of the echoes
  - 2nd: echo but restricted to a portion of the echoes indicated by the classification
  - 3rd: MLE3 retracking after filtering of the waveforms
  - 4th: MLE3 retracking restricted to a portion of the echoes indicated by the classification

The 20Hz retracking outputs (class, ranges, sigma0, SWH, ...) are included in the PISTACH products.

**SEA STATE BIAS**

A study has been performed in order to assess the performances of empirical estimation of regional SSB models. Three zones have been selected: Mediterranean Sea, Bay of Biscay and Gulf of Maine because they represent different types of sea state regimes (dominated by young seas, short or long fetch etc...).

Different SSB models have been obtained on the 3 zones. It was showed that such estimations performed on very small areas prevents from retrieving the real sea state bias.

The PISTACH products will use the SSB model of JASON-2 GDR products.

**PRODUCTS**

Version 1.0: from Jason2 Cycle 12

- **Experimental products** feedback from users welcome and product assessment to be pursued
- **High resolution along-track products:** 20 Hz sampling rate, 1 file per track, no editing
- **Format (NetCDF) and variables/files nomenclatures similar to standard Jason2 I-GDR**
- **PISTACH products easily handled by Jason-2 GDR users**
- **~ 80 additional fields wrt standard Jason2 I-GDR**
- **~ 20 additional fields implemented/copied at 20Hz**
- **CALVAL report to be issued for each cycle**
- **~ 2 products:**
  - Coastal: whole ocean + 25 km fringe over lands + ~ 7 Go/cycle (uncompressed)
  - Hydro: all emerged lands + 25km fringe over oceans + ~ 3 Go/cycle (uncompressed)

**Data Access:**