



## Geoid Gradient Campaign at the Ibiza Island

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A Spanish, with French support, JASON-1 geoid gradient campaign has been made in June 2003 at the Ibiza island in the NW Mediterranean Sea, following an experience at Cape of Begur made in 2002. The main objective has been to map with a new designed, builded and calibrated GPS catamaran, the local geoid gradient in three areas around Ibiza island under the ascending (187) and descending (248) Jason-1 ground tracks. The catamaran equipped with two GPS antennas to perform continuous sea level measurements was towed by the Patrol Deva from the Spanish Navy.

Five GPS reference stations were deployed on Ibiza island: one in Portinatx, two in San Antonio and two in Ibiza. The marine geoid has been used to relate the coastal tide gauge data from Ibiza and San Antonio harbours to off-shore altimetric data. In the framework of the campaign, the levelling of the Ibiza and San Antonio tide gauges to the respective GPS markers was performed.

The tide gauge station of Ibiza harbour from Puertos del Estado belongs to the RED-

MAR network and to the European Sea-Level Service (ESEAS) network. The San Antonio tide gauge was funded by the European Space Agency (ESA) in the framework of the calibration and validation activities of the ENVISAT radar altimeter RA-2.

We present the first results on Jason-1 altimeter calibration using the derived marine geoid. They agree relatively well with results obtained at Corsica, Harvest and Bass Strait calibration permanent sites. Moreover, the geodetic activities (e.g., GPS, levelling) has permitted to build a very accurate (few mm) local network linked to the European one, with a reference frame compatible with the satellite altimetry missions (ITRF2000). The GPS kinematic data were processed using two different softwares allowing to check the consistency of the solutions.

Inasmuch the distances between the tide gauges and the areas covered by the GPS catamaran it has been used the MOG2D ocean model to correct the sea surface from tides.

The IBIZA 2003 campaign and its logistics has made a contribution to the development of GPS, tide gauges and altimetry applications in oceanography and geodesy providing the means for an on-going calibration system for radar altimetry. It has required an in depth involvement in the field campaign, in the processing of the collected data (GPS, tide gauges and altimetry) and in the analysis of the results. One additional result was to confirm the usefulness of Ibiza as a complementary calibration site to Corsica/Senetosa permanent calibration site.

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