The aim of this work has been to examine the relationship of steep bathymetry in the coastal areas around the permanent Cal/Val facility of Gavdos, and their influence on the produced calibration values for the Jason-2 satellite altimeter. The paper describes how changes in seafloor topography (from 200 to 3500m depth over a distance of 10km) are reflected on the determined altimeter parameters using different reference surfaces for satellite calibration. Finally, it describes the relation between these parameter trends and the region’s local characteristics. Using 3.5years of Jason-2 calibration data and careful data analysis, certain features and variations, with permanent signatures at some locations south of Gavdos, have been found in the altimeter bias values. Causes of these variations have been interpreted. Some of these features, for example, at 12km south of the Cal/Val site seem to be related to the general oceanographic circulation, but others of short wavelength (in the order of 1km) are because of the insufficient geoid model resolution. Along Pass No. 109, the concealed effect of bathymetry on the geoid has produced a slope of 3.1cm over 14–21km from Gavdos. Along the other Pass No.18 and in the range 12–21km, a slope in the geoid model, caused again by the sharp changes in the topography of seafloor (from 300 to 3200m depth over a distance of 10km), have been discovered. Those geoid model imperfections do not change the previously reported bias values. Finally, boat campaigns that took place for verifying the previous features, were also used to determine an altimeter bias of B=+19.6±4.5cm, for cycle=80, at 15:14:58 UTC, on 7-Sept-2010, along Pass No. 109. Calibration took place at a distance of about 19km south of Gavdos, in the open sea while Jason-2 was flying over.

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