

Transponder Observations with ERS-1 and ERS-2

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Abstract

Experiments in which transponders have been deployed beneath the ERS-1 satellite have shown that the radar altimeter can measure the range to a transponder deployed beneath it with sub-centimetre resolution. The accuracy of the range measurement then depends principally on the accuracy of the available water vapour path correction. This capability permits a number of applications to vertical position monitoring, orbit studies, and radar altimeter calibration. Applied to altimeter bias calibration, the technique eliminates error sources such as tides and sea state bias. Best results are obtained when the range window of the radar altimeter is preset to a fixed value during the transponder overpass, and this technique has been in regular use on ERS-1 and ERS-2. During the summer of 1995, when ERS-1 and ERS-2 were operating in tandem, a transponder was deployed at a number of sites in Austria on the common ground track of ERS-1 and ERS-2, and was successfully detected by both altimeters. The resulting data enables an assessment to be made of the potential of the transponder technique for comparing the altimeter calibrations. In general transponders offer a unique means to inter-compare the bias calibrations of satellite altimeters, capable of extension to future missions to maintain the continuity of radar altimeter data sets in the long term.

Keywords: Transponder, Radar Altimeter, ERS