Multi-technique TRF realization with Jason-2 as a space tie

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In the present approach used to produce the International Terrestrial Reference Frame (ITRF), observations of the different space geodetic techniques are reduced in independent analyses. The only mean to tie the resulting technique-specific frames into a homogeneous combined frame is then to use local topometric ties between stations of different techniques co-located at the same observatory. However, inconsistencies between these local ties and space geodesy estimates of the station positions are today a major limiting factor of the ITRF accuracy.

An alternative way of tying the different space geodetic techniques together is through the use of multi-technique satellites equipped with instruments of more than one technique. But the main challenge of using such a satellite as an inter-technique link resides in the accurate knowledge (or estimation) of the vectors between the satellite's center of mass and the reference points of its different instruments (i.e. space ties).

In this study, the results from multi-technique (GPS+SLR+DORIS) analyses involving the Jason-2 satellite are presented and compared to the results from traditional single-technique analyses. We assess in particular the effect of simultaneously processing the observations of the three techniques with Jason-2 as inter-technique link on the resolution of the GPS phase ambiguities, on the estimation of the GPS and Jason-2 satellite orbits and on the estimation of the ground station positions.

Moreover, results of the estimation of the Jason-2 space ties will be presented, in order to assess the quality of the presently available values.