



On the effects of single-satellite space ties on the Terrestrial Reference Frame

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Project GGOS-SIM-2, the successor of GGOS-SIM, aims at assessing the potential of co-location in space, so-called space ties, of the four main space-geodetic techniques to realize a global terrestrial reference frame (TRF) meeting the accuracy of 1mm and stability of 0.1mm/yr requirements specified by the Global Geodetic Observing System (GGOS). Space ties allow for a quantification of the systematic errors of the orbit and derived products as the TRF. This is anticipated by proposed co-location in space missions such as GRASP and E-GRASP. In GGOS-SIM-2, among other tasks, we assess the accuracy of the TRF and Earth rotation parameters (ERPs) from GRASP-like satellites alone and in addition to local ties. We therefore simulate the space-geodetic observations for GRASP-type missions and evaluate their potential for the generation of a TRF. We then compare these with the ground simulations from GGOS-SIM and quantify the effect on the TRF in terms of changes in the Helmert parameters and formal errors of the ground station coordinates and velocities and of the ERPs.