Satellite Determined Frame Ties to SLR Coordinates for DORIS and GPS Networks

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Satellite laser ranging (SLR) data from Lageos and Lageos-2 provide precise estimates of the coordinates of the global laser tracking stations, including the origin of the reference frame, or geocenter. In order to align site coordinates of different tracking networks, such as the Global Positioning System (GPS) and Doppler Orbitography and Radiopositioning Integrated by Satellite (DORIS), with the SLR coordinates, Helmert transformations between the networks must be computed and applied. Such alignments require ground surveys between sites from different techniques, and are limited in number and accuracy. Currently, the frames may be aligned at the 10-20 mm level using this approach.

The TOPEX/Poseidon spacecraft supports three tracking systems: GPS, SLR, and DORIS. By simultaneously processing these data types from TOPEX/Poseidon, frame ties of the GPS and DORIS networks to the SLR coordinates can be more readily determined. The results of processing all three data types simultaneously using JPL's GIPSY/OASIS software will be presented.

American Geophysical Union Abstract Form

Reference # 0000
Session 0.00

1. 1995 Spring Meeting

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6. N/A

7. OX published elsewhere

8. Charge $50 to Ronald Muellerschoe
   VISA card 4310-00 00-0000-0000,
   expires 02/96

9. C

10. No special instructions

11. Regular author

Date received: 8 Feb 95
Date formatted: March 9, 1995
Form version: 1.1