HY-2A First POD Results

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Insight into HY-2A POD strategy

- **Satellite characteristics**
  - Launch date: 11/08/15
  - Orbit altitude: 790 km
  - Mass: 1550 kg

- **Tracking data and arcs**
  - Twenty height 7-day arcs (14-day cycle) with a 4-hour overlap
  - Data between 11/10/01 – 12/04/15

- **Models**
  - GDR-D orbit standards
DORIS and GPS Available Measurements

Number of measurements computed over 4-hour intervals

- **DORIS measurements**
  - Several measurements gaps at the beginning of life of HY-2A

- **GPS measurements**
  - Consequences on empirical accelerations
    - Only five parameters estimated per day (1-cpr along-track, cross-track and a bias along-track)
One-cycle-per-revolution Empirical Accelerations

Along-track amplitudes

- Cosine term
  - Slightly higher amplitudes than those associated with Jason-2

- Sine term
RMS of DORIS post-fit residuals (10-seconds phase increments)

- DORIS performance
  - Same level as on Jason-2

- Monitoring of DORIS beacons in the vicinity of the SAA
  - No conclusive sign of degradation due to the SAA effect
Post-fit Residuals on the GDR Solution (2/2)

RMS of GPS phase post-fit residuals

- Overall ~9-mm stable GPS phase RMS residuals (no PCV map applied)
RMS of SLR residuals on core network (7090Yarr 7105Wash 7810Zimm 7839Graz 7840Hers 7941Mate)

- All elevations
  - The GPS-based solution performs slightly better than the DORIS-only orbit

- Above 70°
  - Similar ~2-cm radial orbit accuracy for the different solutions (all highly dynamically constrained)
HY-2A Orbits Comparison: Radial Component

RMS of radial orbit differences relative to the DORIS-only solution

- GPS-based and DORIS-only orbits compare very well in the radial direction (4-7 mm), since all these solutions share identical dynamical models.
HY-2A Orbits Comparison: Along-track Component

Mean of along-track differences relative to the DORIS-only solution

- ~2-cm negative along-track bias between DORIS-only and GPS-based orbits

- 2-cm along-track bias combined with a 24-hour signal
Geographical Map of these Along-track Differences

Mean geographically correlated along-track differences

- Hemispheric pattern with periodic amplitude
Who’s Right Between DORIS and GPS?

Along-track error estimates from SLR reference stations
Mean of Z orbit differences: DORIS-only – GPS-based orbits

- Annual geocenter motion?