Proposal for a new DPOD elaboration scheme

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Until now, the DPOD solution was based on the latest ITRF solution. It only differs by:

i. including of position and velocities of new stations;

ii. updated coordinates and/or velocities of stations which show differences to previous solution larger than 5 cm.

Formal errors of the positions (resp. velocities) are set to 1 cm (resp. 1mm/yr).

New station was added by making use of local ties with either former DORIS or GPS station. Velocity can also be set to a geodetic global model.

Station position and velocity were updated from the analysis of its coordinate time series aligned in the ITRF.
The IDS CC proposes that next DPOD solutions are defined as a cumulative position and velocity solution based on the latest IDS combined series and on the latest DORIS discontinuities. New station is added by making use of local ties with either former DORIS or GPS station. Velocity can also be constrained to match a geodetic global model.

⇒ fully consistent position and velocity solution with consistent formal errors and covariance matrix.
The IDS CC processed 3 different cumulative solutions from the IDS 11 weekly solution files and using the same discontinuity file.

- ids11_08: ITRF2008 like solution, i.e. from 1993:003 to 2008:363.

**Metrics:**

- 3D position and velocity differences at the mean epoch of each couple (station, time period).
  
  ➡️ Direct comparison of the cumulative solutions.

  
  ➡️ Weekly STCD files obtained by propagation of the cumulative solutions.
Top 5 of stations with highest position differences:
GOLA (14.35 mm), AREA (13.98 mm), SODA (12.97 mm), RIOA (12.89 mm), SANA (11.72 mm).

Top 5 of stations with highest velocity differences:
AREB-ARFB (14.04 mm/yr), SODA (4.58 mm/yr, between 1997:159 and 1997:264), SANB (3.82 mm/yr), AMSA-AMTB-AMUB (3.31 mm/yr), JIUB (2.98 mm/yr)

RMS of the position differences is below 1 cm, nearly 5 mm.
RMS of the velocity differences is around 2.5 mm/yr, i.e. 1 cm over 4 years.
• Differences from 1993:003 to 2008:363 are always smaller than 5 cm and smaller than 1 cm for a majority of sites.
Top 5 of stations with highest position differences:
EVEB (6.82 mm, after 2011:261 - EQ), KIUB (4.03mm, after 2013:146, EQ), LAOB (5.28 mm), CADB (3.31 mm), KRWB (3.09 mm).

Top 5 of stations with highest velocity differences:
MANB (2.97 mm/yr, after 2012:169 – EQ), EASB (2.09 mm/yr, after 2011:191 – beacon change), THUB (1.99 mm/yr, after 2013:062), COBB (0.88 mm/yr), RIKB-RILB-RIMB (0.86 mm/yr)

RMS of the position differences is below 1.5 mm.
RMS of the velocity differences is below 0.5 mm/yr.
Main statistics [mm]

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
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<tbody>
<tr>
<td>Maximum</td>
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<tr>
<td>RMS</td>
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<tr>
<td>Median</td>
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<tr>
<td>Mean</td>
<td>1.80</td>
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<tr>
<td>STD</td>
<td>1.52</td>
</tr>
</tbody>
</table>

- Differences from 1993:003 to 2014:362 are always smaller than 1 cm.
• Top 5 of stations with highest differences:
  NOUB (20.18 mm), BELB (19.09 mm), ARFB (18.10 mm), MANB (17.40 mm), SAOB (16.77 mm).

• Top 5 of stations with highest velocity differences after removing stations with ITRF2014 PSD corrections:
  GR3B (4.88 mm/yr), THUB (3.80 mm/yr, after 2011:184), MANB (3.57 mm/yr, after 2012:169 - EQ),
  COBB (2.46 mm/yr), HELA-HEMB (2.41 mm/yr).

• RMS of the position differences is below 1 cm.
• RMS of the velocity differences is around 1.5 mm/yr.
### Main statistics [mm]

- **Maximum**: 61.52
- **RMS**: 13.28
- **Median**: 10.09
- **Mean**: 11.06
- **STD**: 7.37

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IDS AWG – Delft – May 26th 2016
• Differences from 1993:003 to 2014:362 are, excepted for one site and one week only, always smaller than 5 cm and smaller than 1 cm for a majority of sites.
And so?

• So far, the solution ids11_15 seems to be a good candidate for a first new DPOD 2014 solution. Differences with ITRF2014 are at the centimetric level.

• Nevertheless, some further investigations are needed:
  – Orbit tests.

• IDS CC and P. Willis will ask point of view from all the users of the preferred solution. The preconised solution will be implemented by the IDS CC.

• New naming (independent of the future DPOD elaboration scheme): The proposed new convention is dpodYYDDD.snx (.ssc, .txt) where YYDDD denotes the date (YY = year, DDD = day of year) of the last DORIS data used to update the DPOD solution. The ITRF on which the solution was aligned to will be indicated in the file header.
Backslide - AREA

Station: AREA

<table>
<thead>
<tr>
<th>days</th>
<th>min</th>
<th>max</th>
<th>mean</th>
<th>std</th>
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<tbody>
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Backslide - SAKA

Station: SAKA

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<th>Offset [mm]</th>
<th>Differences [mm]</th>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>2004</td>
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Table 1: Offset and Differences for SAKA Station

- X offset: Min 48, Max 150, Mean 89, Std 35
- Y offset: Min -42, Max 45, Mean 3, Std 10
- Z offset: Min -10, Max 50, Mean 20, Std 7
Station: SAKA

- $X$ offset (mm)
- $Y$ offset (mm)
- $Z$ offset (mm)

### Table

<table>
<thead>
<tr>
<th>days</th>
<th>min</th>
<th>max</th>
<th>mean</th>
<th>std</th>
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<tbody>
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