Evaluation of TRF2014
Comparison of ITRF2014 and DTRF2014 vs DPOD2008
Hugues Capdeville, Jean-Michel Lemoine, Laurent Soudarin, Adrien Mezerette
CNES/CLS AC (GRG)

IDS AWG meeting, Delft 26-27 May 2016
TRF2014 EVALUATION

PROCESSING CONTEXT
Impact of the position and velocity coordinates of the DORIS stations from DPOD2008 (DPOD2008 v1.14), ITRF2014 and DTRF2014

Orbits computed:
- DORIS TOPEX orbits (January 1995 to December 1996)
- DORIS SPOT-5 orbits (January 2003 to December 2004)
- DORIS Jason-2 orbits (January 2013 to December 2014)

Available Earth Orientation Parameters only consistent with ITRF2008 (C04 series)

Evaluation of DORIS POST-FIT RMS RESIDUALS and orbit comparison / DPOD2008
DORIS post-fit residuals global and per stations
RMS of radial differences over 2 years
Mean of Z orbit differences over 2 years
TRF2014 EVALUATION

TOPEX DORIS post-fit residuals differences global and per station
(DORIS data from January 1995 to December 1996)

<table>
<thead>
<tr>
<th>TRF</th>
<th>DPOD2008</th>
<th>ITRF2014</th>
<th>DTRF2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>DORIS RMS (in mm/s)</td>
<td>0.481</td>
<td>0.478</td>
<td>0.482</td>
</tr>
</tbody>
</table>

Very small differences but slight improvement from ITRF2014
**TRF2014 EVALUATION**

**SPOT-5 DORIS post-fit residuals differences global and per station**

(DORIS data from January 2003 to December 2004)

<table>
<thead>
<tr>
<th>TRF</th>
<th>DPOD2008</th>
<th>ITRF2014</th>
<th>DTRF2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>DORIS RMS (in mm/s)</td>
<td>0.342</td>
<td>0.344</td>
<td>0.345</td>
</tr>
</tbody>
</table>

Very small differences but slight degradation from DTR2014 & ITRF2014
**TRF2014 EVALUATION**

Jason-2 DORIS post-fit residuals differences global and per station
(DORIS data from January 2013 to December 2014)

<table>
<thead>
<tr>
<th>TRF</th>
<th>DPOD2008</th>
<th>ITRF2014</th>
<th>DTRF2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>DORIS RMS</td>
<td>0.322</td>
<td>0.321</td>
<td>0.320</td>
</tr>
<tr>
<td>(in mm/s)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Improvements from DTR2014 & ITRF2014
Jason-2 DORIS post-fit residuals differences per station
(DORIS data from January 2013 to May 2013)

TRF2014 EVALUATION

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## TRF2014 EVALUATION

### ORBIT COMPARISON / DPOD2008

#### Radial differences and mean Z differences

- RMS of radial differences over 2 years
- Mean of Z orbit differences over 2 years


<table>
<thead>
<tr>
<th>Satellite</th>
<th>RMS radial differences (in mm)</th>
<th>Mean Z differences (in mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>JASON-2</td>
<td>1.31 (std 0.2)</td>
<td>1.71 (std 0.3)</td>
</tr>
<tr>
<td>SPOT-5</td>
<td>1.89 (std 0.5)</td>
<td>1.78 (std 0.6)</td>
</tr>
<tr>
<td>TOPEX</td>
<td>2.8 (std 0.5)</td>
<td>6.71 (std 0.6)</td>
</tr>
</tbody>
</table>

**RMS of radial differences over 2 years**

- The orbits are very close

**Mean of Z orbit differences over 2 years**

- Z-offset is correlated to Tz Helmert parameter differences

*The results are similar when we use EOP C04 series aligned to ITRF2008 and aligned to ITRF2014 (from ftp://hpiers.obspm.fr/iers/eop/eopc04_14/eopc04_IAU2000.62-now)*
Conclusions

DORIS post-fit residuals differences global and per station / DPOD2008


Orbit Comparison wrt DPOD2008 orbit

RMS of radial differences over 2 years
➢ The orbits are very close
Mean of Z orbit differences over 2 years
➢ Z-offset is correlated to Tz Helmert parameter differences

The results are similar when we use EOP C04 series aligned to ITRF2008 and aligned to ITRF2014 (from ftp://hpiers.obspm.fr/iers/eop/eopc04_14/eopc04_IAU2000.62-now)

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ORBIT COMPARISON / DPOD2008

Jason-2 Mean Z orbit differences over 2 years (Jan. 2013 to Dec. 2014)
TRF2014 EVALUATION

ORBITCOMPARISON / DPOD2008
Spot-5 Mean Z orbit differences over 2 years (Jan. 2003 to Dec. 2004)
TRF2014 EVALUATION

ORBITCOMPARISON / DPOD2008

TOPEX Mean Z orbit differences over 2 years (Jan. 1995 to Dec. 1996)