POD Evaluation of DPOD2014 solution by CNES/CLS
IDS Analysis Center
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CNES/CLS AC (GRG)

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DPOD2014 EVALUATION

PROCESSING CONTEXT
Impact of the position and velocity coordinates of the DORIS stations from DPOD2008 (DPOD2008 v1.14) and DPOD2014 v1.0

No use of the periods to reject with DPOD2014

Orbits computed:
- DORIS TOPEX orbits (January 1993 to July 2004)
- DORIS Jason-1 orbits (July 2004 to October 2008)
- DORIS Jason-2 orbits (October 2008 to December 2014)

Evaluation of DORIS POST-FIT RMS RESIDUALS and orbit comparison / DPOD2008
DORIS post-fit residuals global and per station
DORIS-only orbit independent SLR RMS residuals
RMS of radial differences between DPOD2014 and DPOD2008
Mean of Z orbit differences between DPOD2014 and DPOD2008
DPOD2014 EVALUATION ON TOPEX POD

TOPEX DORIS post-fit residuals from DPOD2008 and DPOD2014 and differences (DPOD2014-DPOD2008)

<table>
<thead>
<tr>
<th>DPOD Solutions</th>
<th>DORIS stations Number</th>
<th>DORIS points</th>
<th>DORIS RMS residuals (mm/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPOD2008</td>
<td>39.8</td>
<td>19339</td>
<td>0.454</td>
</tr>
<tr>
<td>DPOD2014</td>
<td>39.8</td>
<td>18887</td>
<td>0.457</td>
</tr>
</tbody>
</table>

Negative => improvement for DPOD2014
Very small differences
Three periods for TOPEX:
- from Jan. 2000 to mid-2004: degradation with DPOD2014 but less measurements (one or two stations less)
DPOD2014 EVALUATION ON TOPEX POD

TOPEX DORIS post-fit residuals differences (DPOD2014-DPOD2008)

Negative => improvement for DPOD2014
Very small differences
Degradation with DPOD2014 except for ~10 stations
Significant improvement for ADEB and SANA
DPOD2014 EVALUATION ON TOPEX POD

TOPEX DORIS post-fit residuals differences (DPOD2014-DPOD2008)

Negative => improvement for DPOD2014

Very small differences

Three periods for TOPEX:
- from Jan. 1993 to Jan. 1998: results very close
with DPOD2014 significant degradation for DIOA and
improvement for SANA
- from Jan. 2000 to mid-2004: except for ADEB degradation with DPOD2014, in particular for HELB
DPOD2014 EVALUATION ON TOPEX POD


<table>
<thead>
<tr>
<th>DPOD Solutions</th>
<th>SLR points</th>
<th>SLR RMS residuals (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPOD2008</td>
<td>1662</td>
<td>4.70</td>
</tr>
<tr>
<td>DPOD2014</td>
<td>1659</td>
<td>4.63</td>
</tr>
</tbody>
</table>

Negative => improvement for DPOD2014
Very small differences but slight improvement from DPOD2014

IDS AWG May 2017


**DPOD2014 EVALUATION ON JASON-1 POD**


<table>
<thead>
<tr>
<th>DPOD Solutions</th>
<th>DORIS stations Number</th>
<th>DORIS points</th>
<th>DORIS RMS residuals (mm/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPOD2008</td>
<td>43.9</td>
<td>36952</td>
<td>0.304</td>
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<tr>
<td>DPOD2014</td>
<td>43.8</td>
<td>36129</td>
<td>0.305</td>
</tr>
</tbody>
</table>

Negative => improvement for DPOD2014  
Very small differences  
Two periods for Jason-1:  
- from Jul. 2004 to Jul. 2007: results close slightly better with DPOD2014  

One or two stations less for DPOD2014
DPOD2014 EVALUATION ON JASON-1 POD

Jason-1 DORIS post-fit residuals differences (DPOD2014-DPOD2008)

Negative => improvement for DPOD2014
Very small differences
Degradation with DPOD2014 except for ~10 stations
Significant degradation for REUB
DPOD2014 EVALUATION ON JASON-1 POD

Jason-1 DORIS post-fit residuals differences (DPOD2014-DPOD2008)

Negative => improvement for DPOD2014
Very small differences
Two periods for Jason-1:
- from Jul. 2004 to Jul. 2007:
  results close slightly better with DPOD2014
- from Jul. 2007 to Oct. 2008:
  except for three stations degradation with DPOD2014, in particular for REUB
DPOD2014 EVALUATION ON JASON-1 POD

Jason-1 DORIS-only orbit independent SLR RMS residuals from DPOD2008 and DPOD2014 and differences (DPOD2014-DPOD2008)
(DORIS data from Jul. 2004 to Oct. 2008)

<table>
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<tr>
<th>DPOD Solutions</th>
<th>SLR points</th>
<th>SLR RMS residuals (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPOD2008</td>
<td>1464</td>
<td>2.61</td>
</tr>
<tr>
<td>DPOD2014</td>
<td>1464</td>
<td>2.58</td>
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</tbody>
</table>

Negative => improvement for DPOD2014
Very small differences but slight improvement from DPOD2014

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DPOD2014 EVALUATION ON JASON-2 POD


<table>
<thead>
<tr>
<th>DPOD Solutions</th>
<th>DORIS stations Number</th>
<th>DORIS points</th>
<th>DORIS RMS residuals (mm/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPOD2008</td>
<td>46.3</td>
<td>52038</td>
<td>0.314</td>
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<tr>
<td>DPOD2014</td>
<td>45.9</td>
<td>51770</td>
<td>0.314</td>
</tr>
</tbody>
</table>

Negative => improvement for DPOD2014
Very small differences
Two periods for Jason-2:

One station less for DPOD2014
DPOD2014 EVALUATION ON JASON-2 POD

Jason-2 DORIS post-fit residuals differences (DPOD2014-DPOD2008)

Negative => improvement for DPOD2014
Very small differences
Results close slightly better with DPOD2014:
- significant improvement for SAA stations ARFB, HEMB and SANB
- significant degradation for ASDB and RIKB
DPOD2014 EVALUATION ON JASON-2 POD

Jason-2 DORIS post-fit residuals differences (DPOD2014-DPOD2008)

Negative => improvement for DPOD2014
Very small differences
Two periods for Jason-2:
- from Oct. 2008 to Jan. 2011:
  results close but with DPOD2014:
    significant improvement for SAA stations ASEB, CADB, HEMB and SANB
    significant degradation for ASDB and RIKB
- from Jan. 2011 to Dec. 2014:
  results close better with DPOD2014 except for 5 stations
  significant improvement for SAA stations ARFB, HEMB and SANB
DPOD2014 EVALUATION ON JASON-2 POD


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<tr>
<td>DPOD2008</td>
<td>1646</td>
<td>2.18</td>
</tr>
<tr>
<td>DPOD2014</td>
<td>1646</td>
<td>2.15</td>
</tr>
</tbody>
</table>

Negative => improvement for DPOD2014
Very small differences but slight improvement from DPOD2014

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DPOD2014 EVALUATION

ORBIT COMPARISON / DPOD2008

RMS of radial differences and mean Z differences


Mean RMS of radial differences per arc

Mean of Z orbit differences per arc

Mean RMS radial differences:
• dispersion and level of RMS higher (and different) between 1993 and 2004
• important drift from 1993 to 2001 for DTRF2014
• a few mm after 2004

Orbit centering difference in the Z direction:
• different geocenter than those of DPOD2008
CONCLUSIONS

DORIS post-fit residuals differences global and per station / DPOD2008
• Differences are at a very low level in particular for the Jason-1 and Jason-2 results
• With DPOD2014, the results are close or better to those obtained with DPOD2008 except for the following periods:
  from Jul. 2007 to Oct. 2008
  from Jan. 2000 to Jul. 2004
• Significant improvement for SAA stations ARFB, HEMB and SANB

Orbit Comparison wrt DPOD2008 orbit
• The orbits are very close in particular before 2004
• The geocenter is different than those of DPOD2008