Need for IGS RT/NRT Tropospheric Products

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Overview

- IGS is a voluntary federation that pools resources and data from permanent GPS & GLONASS stations to generate precise GPS & GLONASS products.
- IGS provides the highest quality data and products.
- NOAA/ESRL considers IGS products to be the “gold standard” when it comes to GNSS applications in support of Earth science research and multidisciplinary applications such as atmospheric remote sensing.
<table>
<thead>
<tr>
<th>Description</th>
<th>Precision</th>
<th>Latency</th>
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<tbody>
<tr>
<td>Ultra-Rapid tropospheric zenith path delay</td>
<td>6 mm</td>
<td>2-3 hours</td>
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<tr>
<td>Final tropospheric zenith path delay</td>
<td>4 mm</td>
<td>&lt; 4 weeks</td>
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RT/NRT Tropospheric Products Are Now Produced Worldwide
RT/NRT Tropospheric Products Are Now Produced Worldwide

- Europe  E-GVAP  0.25-h
- United States  NOAA  0.5-h
  SuomiNet  1.0-h
- Taiwan  CWB  2.0-h
- Japan  GEONET  unk
- China  CMA  unk
- Korea  KMA  unk
- Others  TBD  unk
IGS Products are the Common Denominator

- All of these networks utilize IGS work-products including:
  - IGS Station Coordinates
  - GPS Satellite Ephemerides/Satellite & Station Clocks
  - Earth Rotation Parameters
  - Antenna Phase Center Models.
- IGS acts as an enabler of world-wide scientific and technological innovation.
- The science and technology of producing RT/NRT tropospheric products is fairly mature.
- GNSS networks around the world are currently transitioning from R&D into operations.
RT/NRT Tropospheric Products Are Now Used Quasi-Operationally
NOAA Trop Model Constrains CRTN & WCDN
Two Questions for Discussion

• Given that RT/NRT tropospheric products are now routinely produced by non-IGS entities, and

• Given that the number of these entities will likely grow in the future:
  ▪ Are IGS RT/NRT tropospheric products redundant?
  ▪ If not, what purposes do they serve?
There is a Need for IGS RT/NRT Tropospheric Products

- IGS RT/NRT tropospheric products would provide independent points of comparison around the world.
- Their purpose would be to verify and validate local-regional RT/NRT tropospheric signal delay estimates.
- Local-regional RT/NRT networks would have to incorporate one or more IGS sites as fiducials.
- The IGS products would used for quality control and to help identify problems in local-regional applications requiring RT/NRT tropospheric estimation.
What Would a Global IGS RT/NRT Tropospheric Product Look Like?

TPW as a proxy for ZWD
TPW as a proxy for ZWD

ALT as a proxy for ZHD
Where Would the Observations Come From?

An experimental NOAA blended TPW product using satellite passive microwave measurements offshore and GNSS observations on shore.
Is This Something IGS Wants or Needs to Do?

- Where will the observations come from?
- What spatial resolutions are needed over what domains?
- How will the observations be analyzed and who will analyze them?
- What maximum ZTD errors can be tolerated?
- Who will produce and distribute the products?
- What are the verification/QC issues?
- Who is going to use them?
- How will they be used?
Thank You for Your Attention!
Any Questions?