Doris phase measurements, rinex format
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New instrument generation and new measurement file format
- more channels (two for Jason 1, six/seven for Jason 2)
- new measurement definitions:
  Jason 1: co-ellipsoidal and i3 measurement
  Jason 2: synchronous phases and pseudo-range

Doris Rinex format, extension of GPS Rinex 3 format

Around 30% of the measurements are below 10 degrees. These measurements are affected by the POI process and are probably requiring repositioning or troposphere analysis.

The Doris Rinex Format

GPS-based phase and pseudorange measurements all-instrumental delays removed
Synchronous observation (limited to Jason 2),
Example of a derivate:

\[
\frac{\partial \Delta \phi}{\partial \Delta \gamma}
\]

Pseudo-range measurements processing:

Objective: estimate the on-board clock offset, \( \Delta \gamma \),

\[
\Delta \gamma = \frac{1}{n} \sum_{i=1}^{n} \phi_i - \frac{1}{n} \sum_{i=1}^{n} \gamma_i
\]

Use of the model or station measurement quantities only,

\[
\Delta \gamma = \frac{1}{n} \sum_{i=1}^{n} \left( \phi_i - \gamma_i \right)
\]

Other formulation:

\[
\Delta \gamma = \frac{1}{n} \sum_{i=1}^{n} \left( \phi_i - \gamma_i \right) - \Delta \gamma_0
\]

Phase measurement characteristics:

Topofigm model effect on data phase measurements

Phase measurements after corrections

Other characteristics (not specific to Jason 2):
- Measurements below zero Doppler are flagged as invalid, but must be processed in order to achieve the phase continuity over a pass.
- Doppler for collisions: when two satellites are the same Doppler, measurements are not performed, will be rejected and the phase continuity is not preserved.

Conclusions

Doris format: very easy to use;
No specific satellite correction to apply
Can be used for both pseudorange and phase;
Currently used in the POI Jason 2 program.

Phase measurement errors:
- Distribution of the small cycle slips occurrence
- Jitter on a few hours standard deviation
- The primary cause is unmodeled L1/L2 cycle slips
- 10% slip due to multipath

Averaging and variance analysis:
- Standard deviation of the five slippage model is 5 cycles
- 10% slip due to multipath

Doris solution is using phase (no process), there are limitations for the small errors behavior.