



1. Update since the last meeting

2. Research perspective

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IGN/IPGP status

- Review of around 20 years of orbits still in progress by CNES
- Taking into account the PCVs of the station antennas
- First computation of station positions and EOPs + daily SINEX creation (The SINEX format still needs to be improved – currently close to GNSS format)
- Implementation of the weekly SINEX solutions via Pytrf (P. Rebischung software). Two types of weekly solutions considered:
- * Mono-satellite weekly solutions
- * Multi-satellite weekly solutions

Is it interesting to keep daily solutions (mono / multi-satellites) ? ZTD products ? => (ICCC)

Research in progress

- Impact of ITRF2020 on DORIS orbits => Comparison ITRF2020, JTRF2020, DTRF2020 for DORIS

- Between the end of 2022 and the beginning of 2023, we have supervised two internships on DORIS data processing :

* <u>Is DORIS processing affected by multicolinearity effect ?</u> Very interesting results that need to be further investigated : We plan a poster in the next IUGG on this topic.

* Impact of different models on the satellite orbits.

Research in progress

Summary of the student internship on the orbits :

Initial goal: To evaluate the impact of different physical (gravity fields, tides, etc.) or mathematical (parameter evolution models, noise level) models on DORIS orbits. Can we observe specific patterns related to a specific model?

<u>Results</u>: Due to the time constraints, only a few models compared (tides models and gravity field).

- The students set up a set of comparison and visualization tools.
- Following discussions with G. Lion, it appeared to us that it would be very interesting to provide tools for comparison and visualization of Keplerian orbital parameters (a, e, i, etc.) instead of pos+vel parameters => Easier to have physical interpretation of results + to study energy balances.
- G. Lion, specialist in the dynamic studies of orbits, joined our team to work with us on this subject.

Example : semi-major axis variation with tide models

Differences of semi-major axis between taking into account all tides or only specific tides



Example : semi-major axis variation with tide models

	No tide models	No solid earth tide model	No polar tide model	No ocean tide model
Semi-major axis differences (mm)	129.9	141.2	2.7	19.3
	Need to be	investigate !		

Why removing only solid earth tide have a greater impact than removing all the tide effects ?



-1.5

Research perspective

Five year perspective :

* <u>Multicolinearity effect analysis on DORIS</u> => Toward specific satellite combination for references (TRF, EOPs, ZTD) or specific satellite models per day ?

- * Noise estimation (mainly observations and stochastic parameters) by VCE
- * <u>Clock problem</u> :
- To separate clock errors from satellites and clock errors from stations in a multisatellite process => Improving SAA processing ?
- To evaluate the interest of a very precise clock on-board satellite or for stations
- * <u>Balance of errors on the orbits</u>
- * ZTD estimation in a multi-satellite data computation

