# Analysis Issues

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# Outline

1. Newest orbit differences (GAU vs GSFC)
2. Modelling summary for AC's.
3. Paper Proposal for ASR.
4. Perspectives, Challenges, and Future work.

# Gravity & Tide Summary

| Center | Static Gravity | Time-Varying Gravity | Atmosph. Gravity | Air tides | Earth Tides | Ocean Tides |
|---|---|---|---|---|---|---|
| IGN | GGM03S (120x120) | GGM03s | No | No | Wahr ? | ?? |
| LCA¶ | Eigen-GI04 | +rates? + periodic | Yes,ECMWF ?x? | Yes | IERS2003 | FES2004 |
| INA# | GGM01C | GGM01C | No | No? | IERS2003 | CSR3 |
| GOP | Eigen-GL04S (100x100) | +rates | Yes. ECMWF ?x?. | ? | IERS2003 | CSR3 |
| ESA | Eigen-GL05C or EIGEN-GL04s? (?x?) | + seasonal to 50x50 | Yes. NCEP, 20x20. | ? | IERS2003 | FES2004 |
| GSC (wd09) | Eigen-GI04s (120x120) | + annual 20x20 from GRACE | Yes. ECMWF 50x50. | Yes. | IERS2003 | GOT4.7 |
| GAU | GGM02C | GGM02C | Yes/NCEP 50x50. | Yes. | IERS2003 | GOT00 |
| NCL | GGM02C | GGM02C | No? | ? | IERS2003 | GOT00 |

# Nonconservative Forces

| Center | Atmos. Model | Cd Freq. | Macromodels | Sat. Specific Models | Albedo/IR |
|---|---|---|---|---|---|
| IGN wd08 | DTM94 | @1hr Sp245ENV | Yes. Source? | No | Yes/No? |
| LCA wd20 | DTM94 | @4hrs Sp245ENV | Yes. Not CNES? | ? | Models or ECMWF? |
| INA# | DTM94 | ? | Yes. Source? | Top. Others? | Yes/Yes. |
| GOP | | | N/A | | No |
| ESA | MSIS90 | @2.4hrs Sp245ENV | Yes. | Angara (ENV only) | Yes, Model? |
| GSC (wd09) | MSIS86 | @6hrs Sp245ENV | Yes. Source? | Yes. TOP. UCL (ENV,JA1) SP2 | Yes/Yes |
| GAU | MSIS86 | @6hrs Sp245ENV | Yes | Yes. | Yes/Yes |
| NCL | MSIS83 | @6hrs | Yes. | No | ? |

# Troposphere Modelling

| Center | Elev Cutoff | Model Apriori | Mapping Function | Low Elev downwt. | Adjust |
|---|---|---|---|---|---|
| IGN wd08 | From CNES | GPT? | Lanyi? | No? | Wet |
| LCA wd20 | 12º from dsc file. No to FGL | < 2002 DORIS met > 2002 ECMWF | Guo and Langley | Downwt ftn applied < 20 deg | Wet |
| INA# | 15º | ? | ? | No | Wet |
| GOP | 15º? | GPT | GMF | ? | Wet |
| ESA | 10º | GPT | GMF | No | Wet |
| GSC (wd09) | 10º | GPT (was Doris met) | Neill (was Hopfield) | No | Wet+Dry |
| GAU | 12º | Doris Met | Neill (was Hopfield) | No | Wet+Dry |
| NCL | ? | GPT | ? | ? | Wet |

# Model Comparison Comments

1. Description files for SINEX don't match presention information (from November IDS workshop, for example).
2. Information is Incomplete.
3. Information or Description files do not exist.

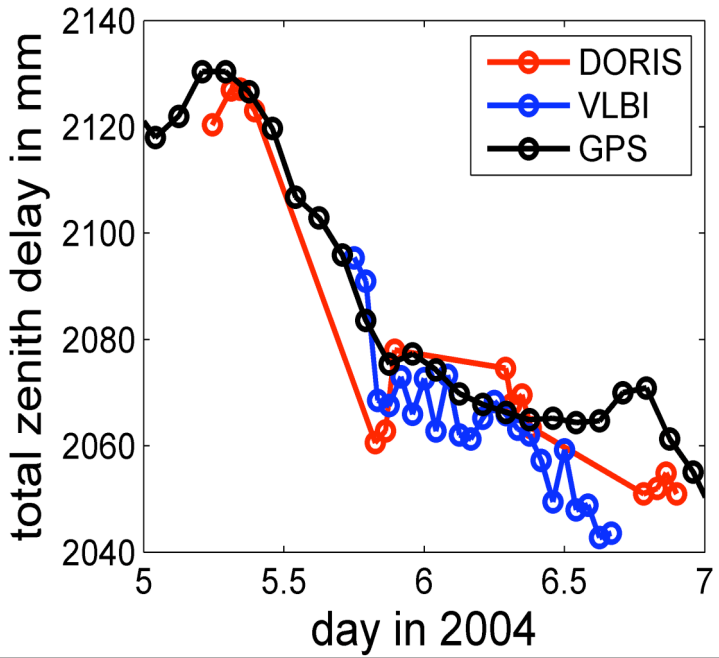
# Joint Paper Proposal for ASR

1. Orbit Comparison, 2003?, 1 year all centers, all satellites (+ another year, 1995 for Spot 3). Orbits should correspond to final SINEX submission or an archived SINEX submission.
2. Intercompare Residual empirical opr amplitude (along & cross-track), one year, all satellites.
3. Troposphere comparison: 1 week, 4? stations; Total Zenith delay (see next slide as example)
4. Paper would include modelling summary to show status of modelling at the centers ….

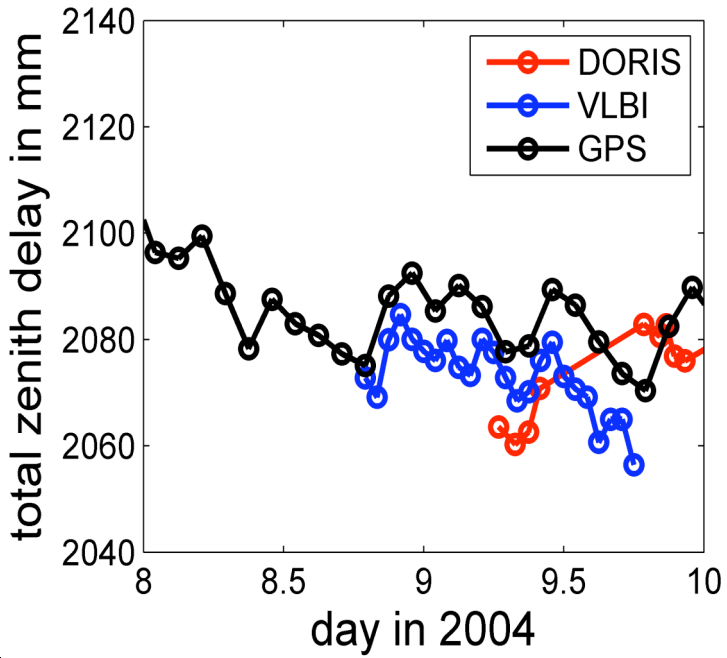
# Troposphere comparisons

- **DORIS, like VLBI & GPS must estimate troposphere corrections.**
- **Corrections are estimated pass-by-pass (typically 10-15 min, ~2X per satellite & DORIS station, and per day).**

## Hartebeesthoek




## Kokee Park




**Preliminary (example) comparisons from VLBI & GPS (Johannes Boehm) and DORIS (Pascal Willis).**

# Perspectives and Challenges.

1. What do we need to do to complete the IERS submission?
2. What is the impact of data distribution, elevation cutoffs, troposphere modelling, mapping functions on scale? Is it possible to have an absolute DORIS scale?
3. What is impact of offsets? How do improper cgmass/offset knowledge affect COM corrections?
4. Second Order Ionosphere. How important is this effect?
5. What are the impact of software changes on the Level 1B DORIS data? (Eg ENVISAT Late 2004).
6. Atmospheric Loading? What is impact on DORIS processing? Are we ready for this?
7. Operational time series: Will we soon have three centers making weekly deliveries?
8. Improvements in Nonconservative Force modelling; UCL-type models for SPOT satellites; Availability of quaternions for TP & Jason-1,2; Improvements to atmosphere modelling from GRACE+CHAMP Accelerometer data?
9. Open issue. Define orbit format for deliveries by AC's. sp3 or sp1? (Mixture of formats at CDDIS).

# Thank you for your attention!