



Session T4: DORIS Data Analysis Position Paper

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SUMMARY

- Purpose of a “Position Paper”
- Organizational aspects
- IDS Products
- DORIS inputs
- DORIS data analysis
- Conclusions



Purpose of a “Position Paper”

- Make a fair analysis of the present situation
- Identify present problems
- Propose ways to solve them
(recommendations discussed before and during the meeting)

NB: Position paper is posted on Web site since April 20, 2004



Product	Present AC	Previous AC	Proposed AC	Combined product
Cumulative solutions (positions/velocities)	IGN/JPL LEGOS	U. Texas	INASAN Geosciences Australia IAA	No
Weekly series	IGN/JPL	INASAN SOD SSALTO	Geosciences Australia IAA LEGOS	No
Monthly series		IGN/JPL INASAN LEGOS/CLS SSALTO	Geosciences Australia IAA	No
Geocenter	IGN/JPL	LEGOS	INASAN	No
EOP	IGN/JPL	LEGOS	INASAN	No
Orbits	LEGOS		U. Texas	No
Ionosphere		SSALTO		No

Organizational aspects

- What is needed?
 - More active ACs
 - Understand present difficulties from groups
 - Attract previous and new groups
 - At least 3 ACs per product

- *Recommendation 2.4:* It is important that more Analysis Centers participate in the generation of the IDS products. Groups wanting to participate must receive some help from the already existing AC. It is also important to understand why some groups stopped delivering results and to encourage them to resubmit new results.

See presentation: R. Govind + P. Stepanek + E. Yagudina

- *Recommendation 2.1*: IDS should conduct a survey to understand how its products are currently used and how similar products from other Technique Service (TS) such as IGS, ILRS and IVS are used. The survey should also point out products that are considered as useful but that are not presently used as they could. If possible the survey should also address the impediments that might presently prevent potential users to use the current products. After this survey, IDS should decide on the list of the products to generate and also when necessary propose products to be stopped.



IDS Products

- What is needed
 - Who is using them, how? --> study
 - Definition/validation needed
 - Need for multiple solutions + combination

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- **Recommendation 2.2:** A procedure must be explicitly stated to formally accept a DORIS product as such, including a technical feasibility study and a validation component. We should presently start assuming that no such IDS product exists presently and to generate them one by one using a standard procedure.

See presentations: J.-J. Valette + M. Feissel-Vernier

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- **Recommendation 4.1:** The Analysis Coordinator, after discussion with the ACs and with the product users (starting with IERS) should define a clear strategy of how improving current products without losing the homogeneity and the continuity of the time series. A trade-off compromise should be found.

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- **Recommendation 5.1:** The Analysis Coordinator should propose validation procedures before accepting any IDS individual solutions and IDS product, either internal through combination or external using any type of information. These validation procedures should be an important part of the IDS product definition.

See presentation later: M. Feissel-Vernier



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- **Recommendation 2.3:** Split the current DORISMail into DORISMail (general information for a large DORIS audience) and DORISReports (regular reports for Analysis Centers).

IDS Inputs

- There has been some significant improvement from CNES concerning DORIS data delivery
- Problem with Jason/DORIS data --> switch to on-board back-up receiver?
- More satellites needed (Pleiades?, NPOESS?)
- Access to “raw data”?

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- **Recommendation 3.1:** The IDS thanks the CNES for the improvement made recently in the DORIS data delivery (including Envisat data) and request to have access to all DORIS data no later than 6 weeks after the day of the last measurement to really allow the generation of a unified DORIS weekly solution within the IERS time constraints.



DORIS acronym	Start of observation (Year-DoY)	DORISM al date	DORISM al number	Start of data delivery (Year-DoY)	Data loss (in days)
THUB	2002-28	52002-30	4 205	2002-33	1 46
KOLB	2002-31	62002-34	4 208	2002-32	1 5
SALB	2002-34	62003-01	7 216	2002-35	6 10
MANB	2003-05	72003-08	3 232	2003-06	4 7
HEMB	2003-08	02003-10	1 236	2003-10	5 25
SPJB	2003-23	12003-24	1 260	2003-24	6 15
GAVB	2003-27	02003-28	8 266	2003-33	6 66
YASB	2003-33	12003-35	3 282	2003-35	6 25
JIUB	2003-34	42003-35	8 283	N/A	≥ 113
CROB	2003-35	52004-03	6 299	2004-03	1 41
MSIB	2004-03	12004-10	5 313	N/A	≥ 61
BELB	2004-03	72004-06	5 306	2004-08	3 46
CADB	2004-08	52004-10	0 312	N/A	≥ 7

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- **Recommendation 3.3:** CNES, in liaison of the IGN/SIMB and the chairman of the Station Selection Group, should maintain a list of stations that participate in the IDS, through the DORIS permanent network or through DORIS campaigns as organized by the Stations Selection Group.



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- **Recommendation 3.4:** Tests should be conducted between CLS and 1 or more AC to finalize the delivery of DORIS data for stations outside the permanent network.

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- **Recommendation 3.6:** IDS request CNES to officially ask for the release of the DORIS/Pleiades data for scientific uses within the IDS and also to investigate the possibility to add future DORIS receivers on-board future other Space Agency missions, specially constellation of satellites such as NPOESS to ensure the current number of DORIS receivers in flight or even to increase it.



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- **Recommendation 3.5:** CNES should define a new DORIS format for a lower preprocessed level and should make available some test data sets for all satellites during a short period of time to let the IDS AC investigate about the potential advantages of these new types of DORIS data.

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- **Recommendation 3.2:** In order to use the DORIS/Jason data to generate the geodetic IDS products, the IDS encourages CNES to turn on the back-up DORIS receiver on-board the Jason satellite to test if its oscillator would be less sensitive to radiations over the South Atlantic Anomaly within the next three months. This change of receiver should be done as soon as possible. The IDS will then investigate if the new receiver performs better for geodetic applications and provide some feed-back to CNES.

See presentations later (J. Ries + J.M. Lemoine)

IDS Models

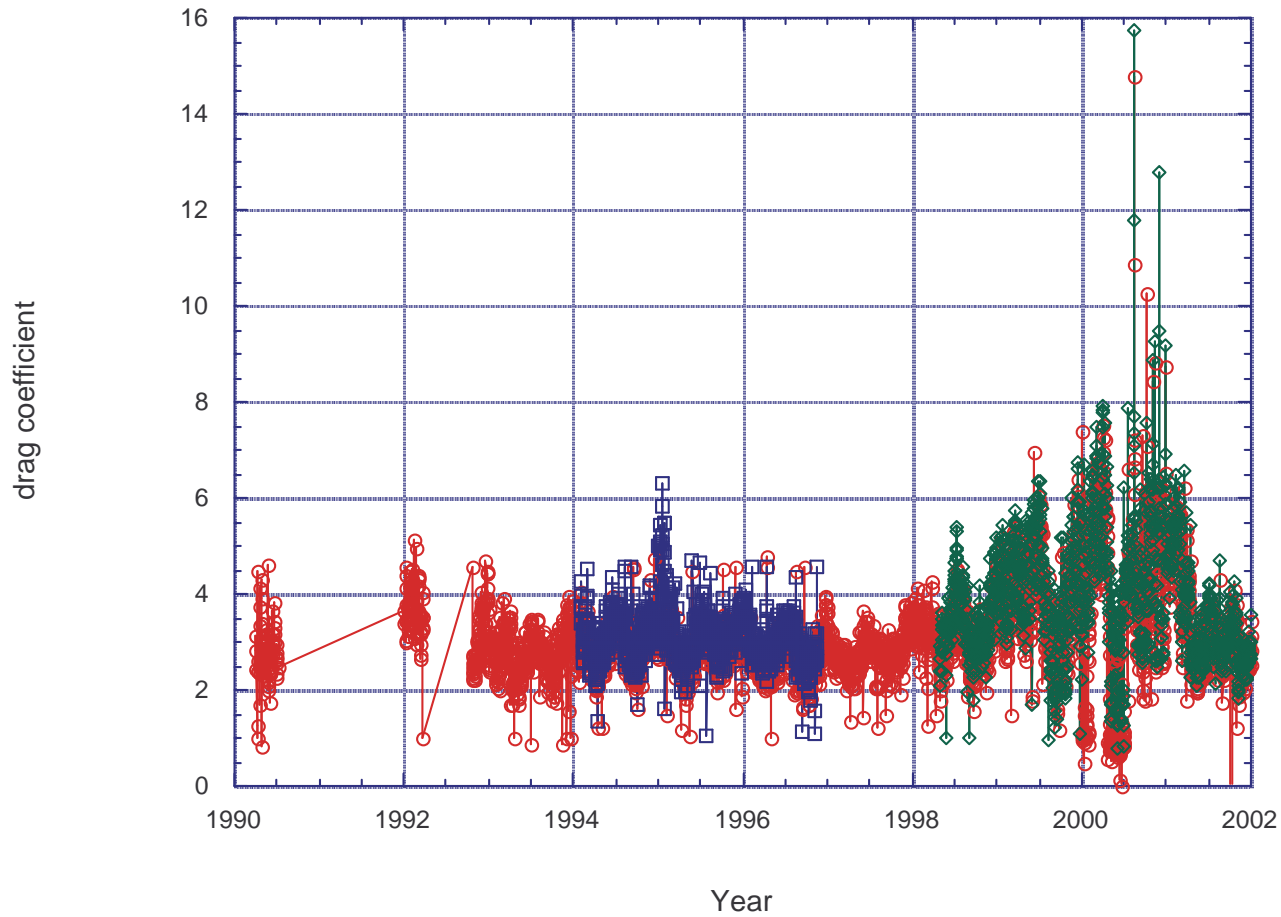
- New models: need a strategy to adopt them.
- Example:
 - Gravity field (cf campaign),
 - presentation J.J. Valette
 - tropospheric correction,
 - presentation L. Soudarin
 - Surface forces (drag, solar pressure, albedo)
 - others....

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- **Recommendation 4.2:** ACs should compare their current DORIS models and analysis strategies, starting with the tropospheric corrections for which several groups have really different approaches.

See presentation later: L. Soudarin

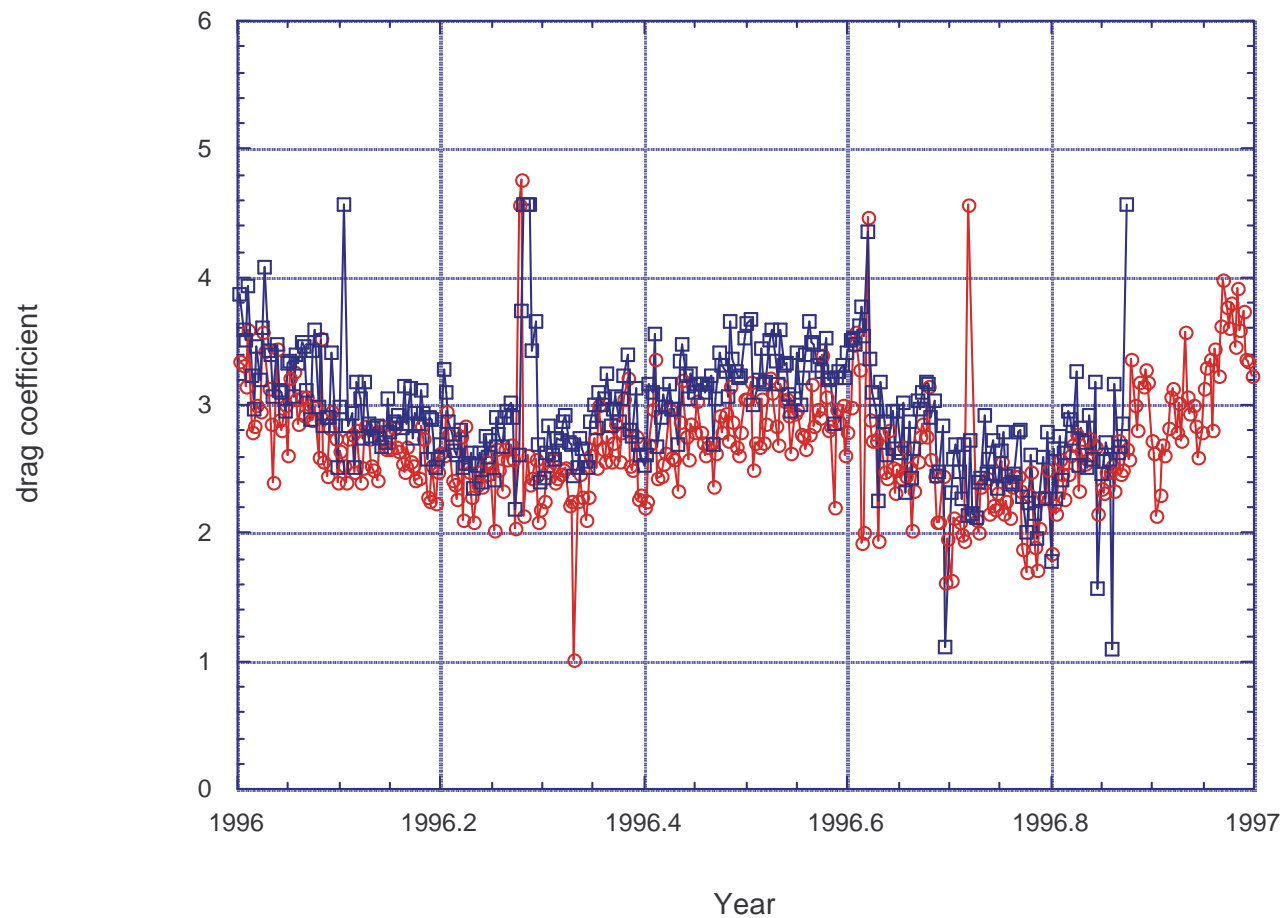


DORIS /SPOT drag coefficients Gipsy/Oasis II daily estimations (at 21:00)



- SPOT2 drag
- SPOT3 drag
- ◇ SPOT4 drag

DORIS /SPOT drag coefficients Gipsy/Oasis II daily estimations (at 21:00)



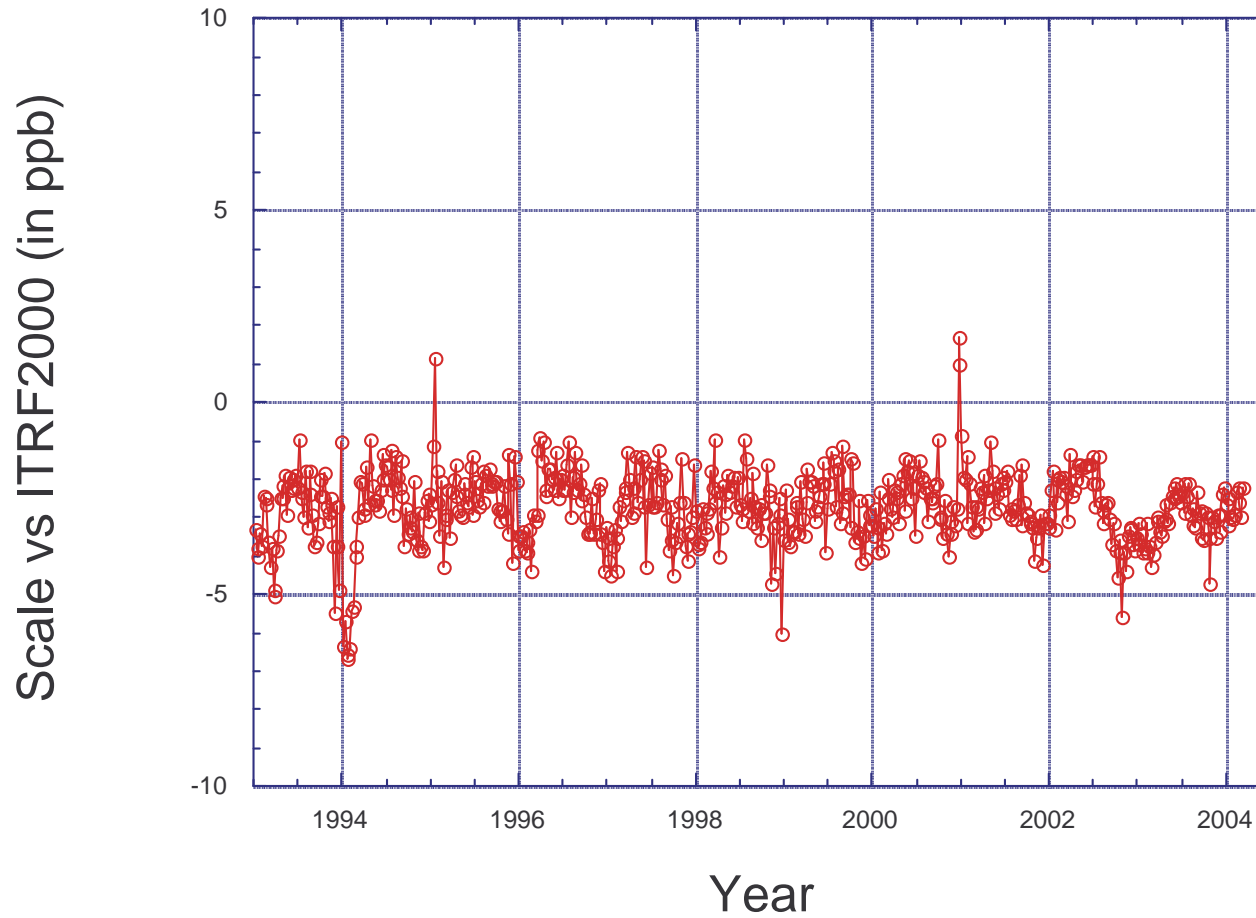
Present systematic errors in IDS products

- Examples:
 - TZ : SPOT4 (1998.5-1999.0)
 - Scale factor (-2.5 ppb vs ITRF2000)
- What should we do?
 - Understand the problem? (software vs DORIS) by comparing solutions between different groups or different data sources
 - Correct it? Ways to do so?



—○— scale vs ITRF2000 (in ppb)

DORIS global scale IGN/JPL weekly solutions (all satellites but Jason)

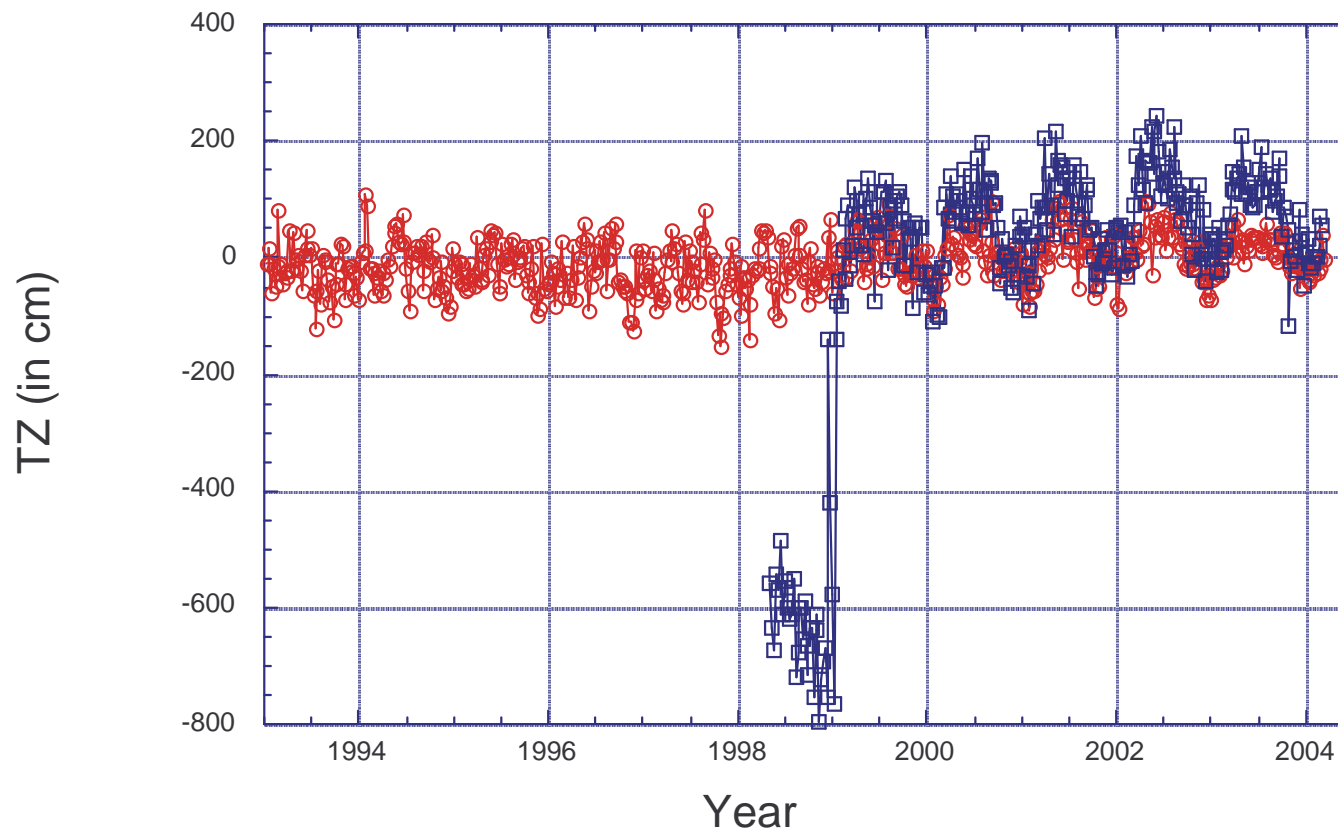




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- **Recommendation 4.3:** The IDS, in collaboration with the ITRF Product Center should investigate if the scale bias between DORIS solutions and the ITRF is inherent to the DORIS system or if it is inherent to a specific DORIS software. It should investigate technical ways to compensate such an effect (by using a posteriori satellite or ground antenna offset).

—○— All satellites (except Jason)
—□— SPOT4

Geocenter (TZ-component)



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- **Recommendation 4.4:** Different ACs should test if the estimated TZ translation (compared to ITRF2000) of their solutions using only SPOT4/DORIS data either from one of the IDS data center or directly from the raw measurements files available in Toulouse possess a significant bias from may 1998 to January 1999.



CONCLUSIONS

There is a real start of an IDS service including several ACs

What is needed now :

- More active ACs
- Definition/validation of products
- Specific studies (scale, TZ, tropo models,...)

We are on our way...