

Development of stochastic modeling for DORIS simulations in GGOS-SIM

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Project GGOS-SIM

- Simulations of the 2008 - 2014 ground networks of all space-geodetic techniques close to reality
 - DORIS
 - GPS
 - SLR
 - VLBI
- Effects of technical improvements of the space-geodetic techniques on the global Terrestrial Reference Frame (TRF)
 - F.i. new sites

Project GGOS-SIM

Motivation here:

- Processing of real observation data to generate conditions for simulation close to reality
 - Time and number of observations
 - Precision of observations
- Development of a stochastic model for the simulation
 - Elevation dependent?

DORIS Orbit Determination

Selected Missions:

ENVISAT

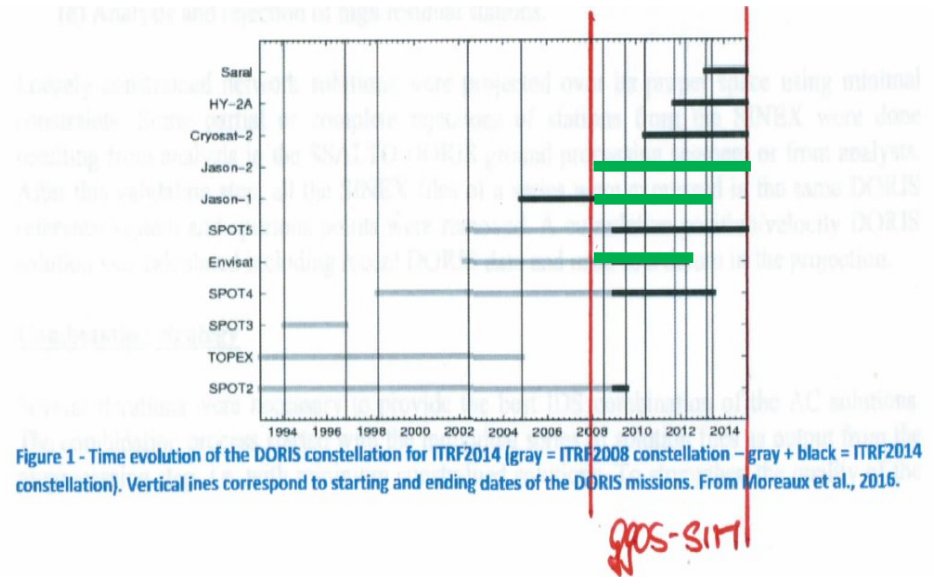
- JAN 2008 – APR 2012

JASON1

- JAN 2008 – JUL 2013

JASON2

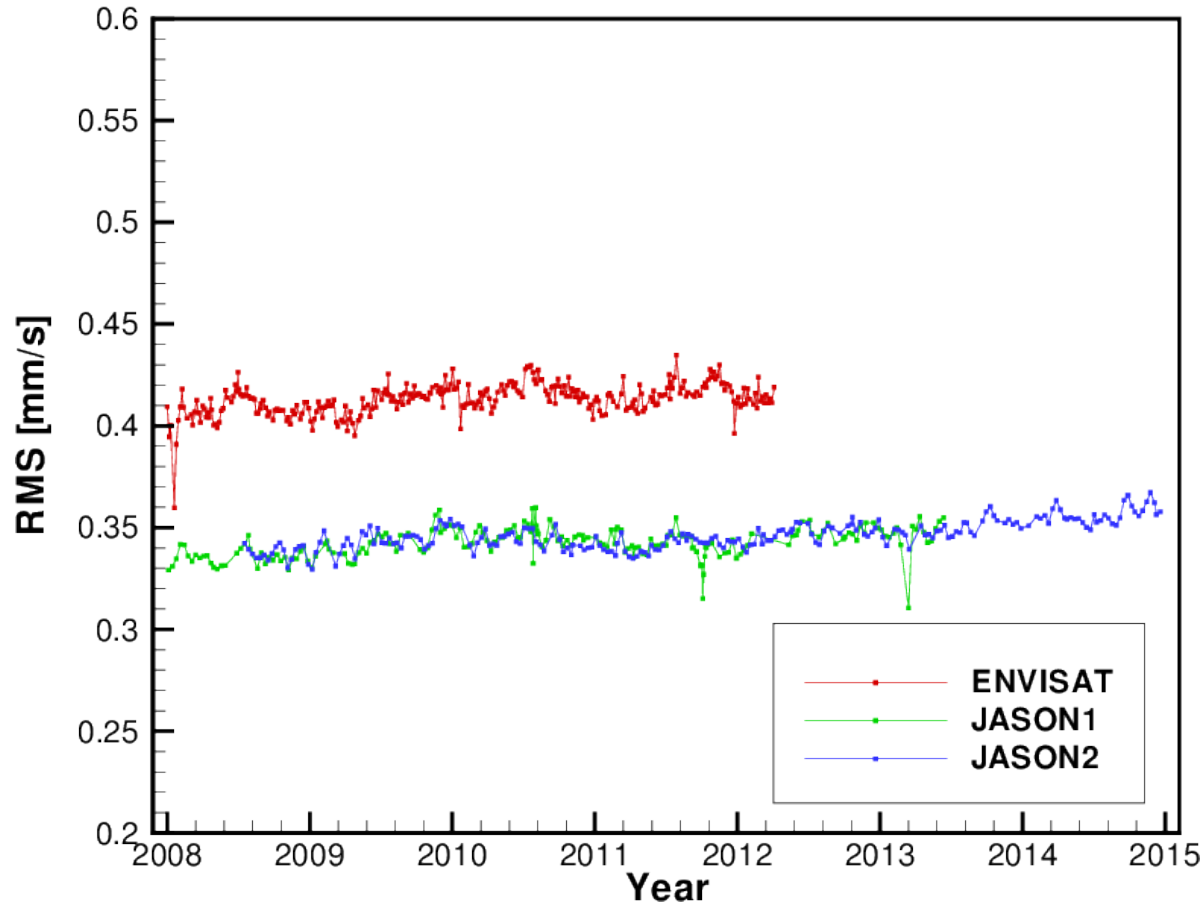
- JUL 2008 – DEC 2014



Graphic from: Moreaux, G., Lemoine, F.: The DORIS contribution to ITRF2014.

DORIS Orbit Determination

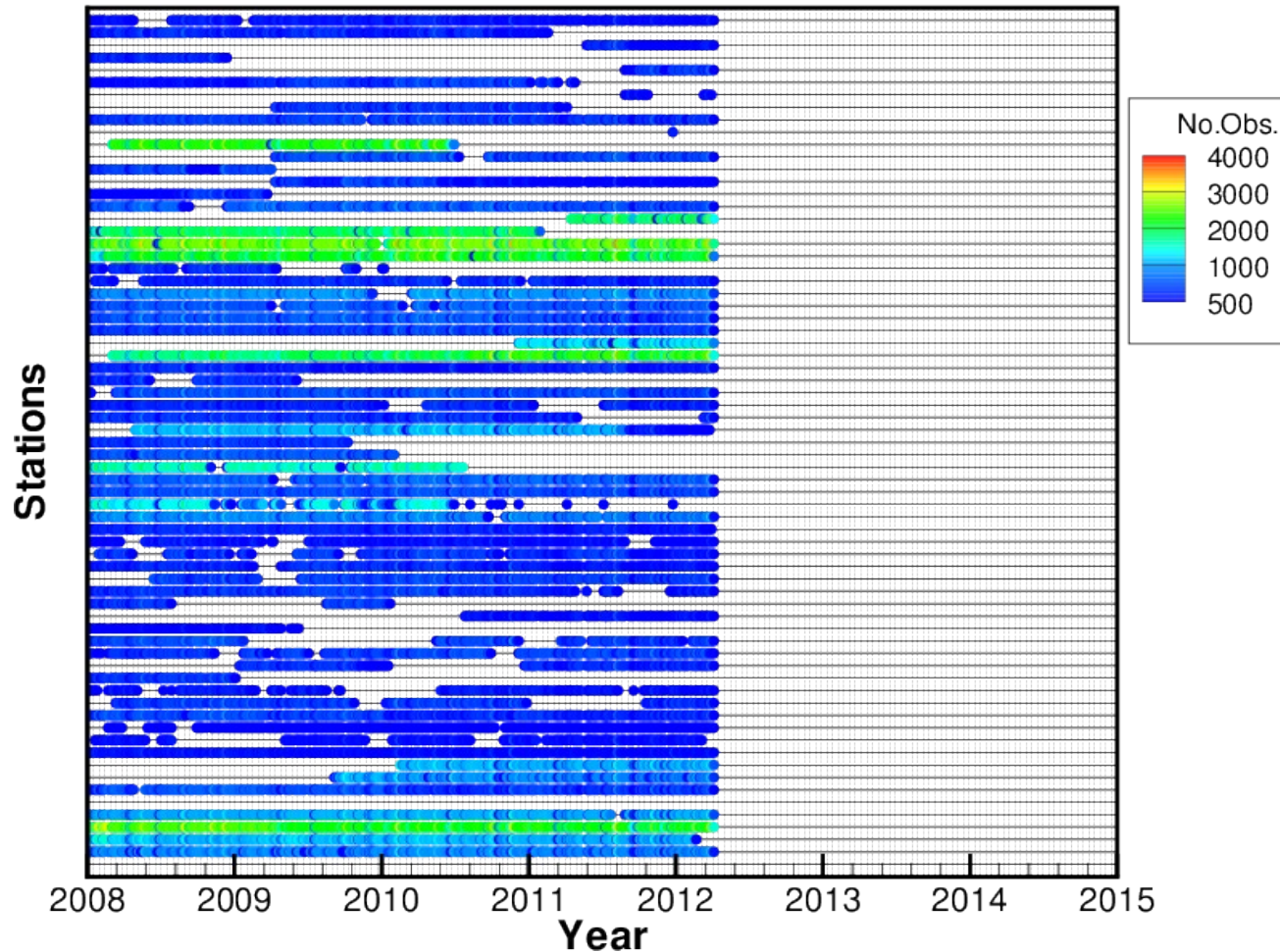
RMS values of DORIS observations



	DORIS RMS [mm/s]	SLR RMS [cm]
ENVISAT	0.41	14.8
JASON1	0.34	7.7
JASON2	0.35	5.7

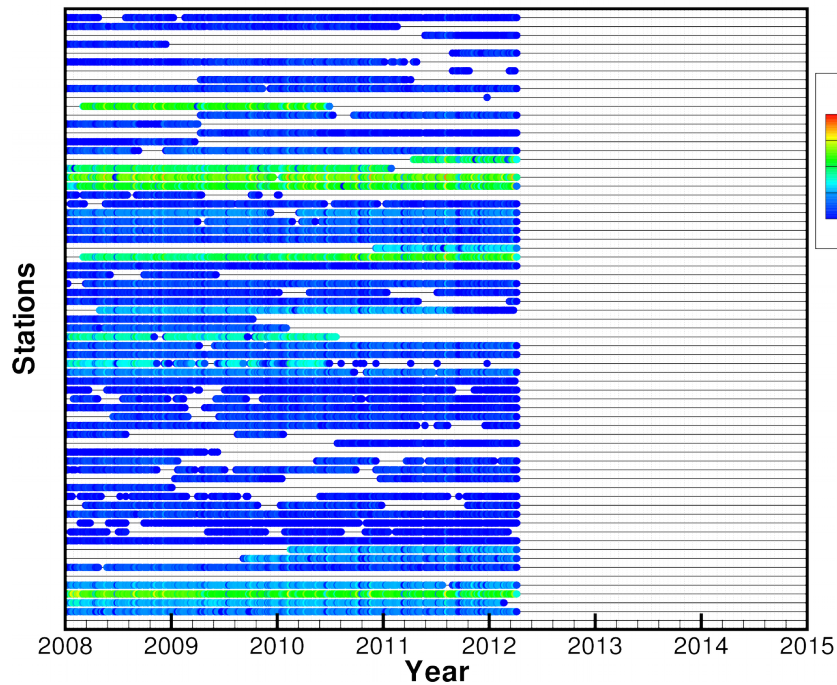
DORIS Orbit Determination

ENVISAT DORIS OBSERVATIONS_ACCEPTED

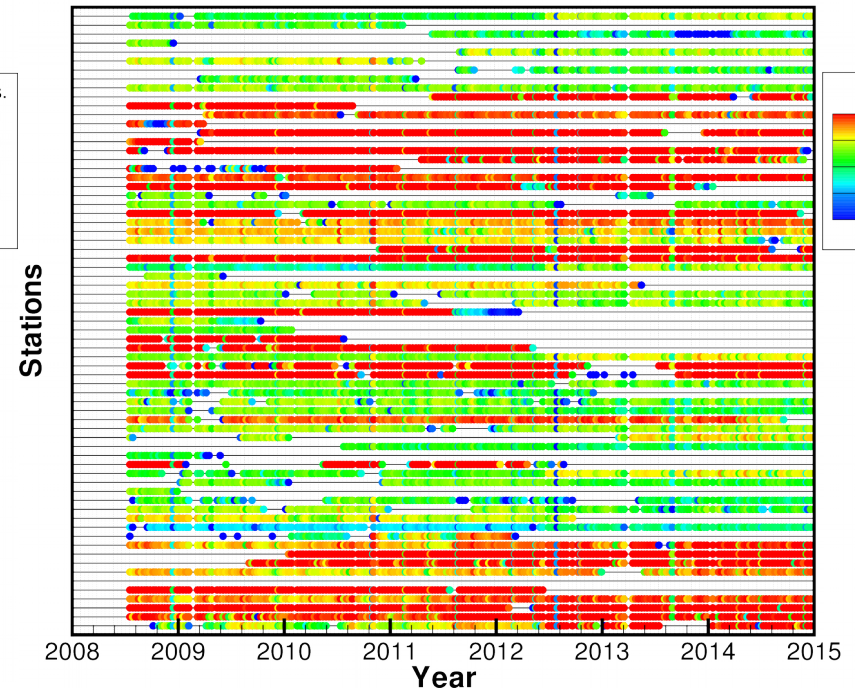


DORIS Orbit Determination

ENVISAT DORIS OBSERVATIONS_ACCEPTED

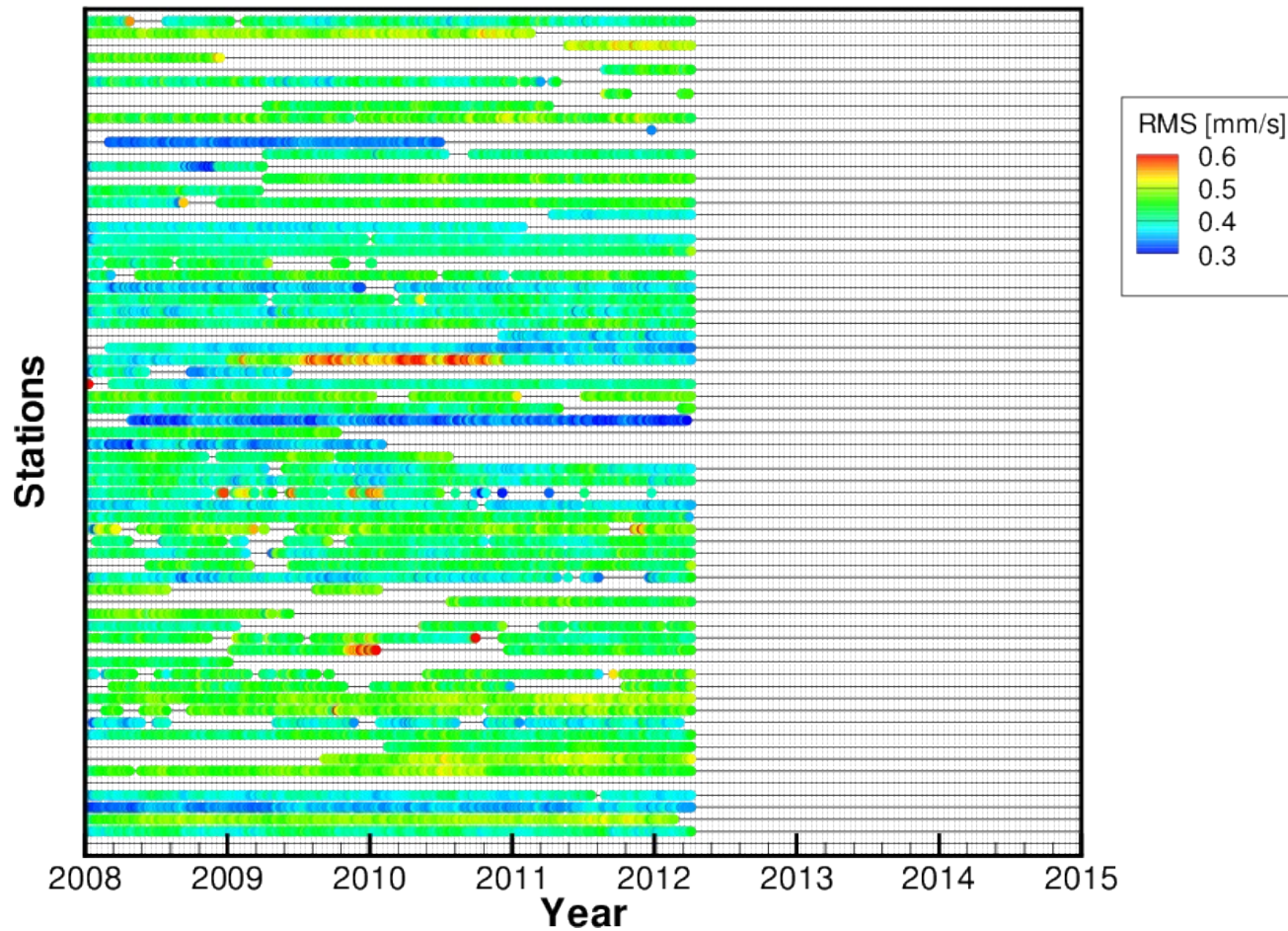


JASON2 DORIS OBSERVATIONS_ACCEPTED



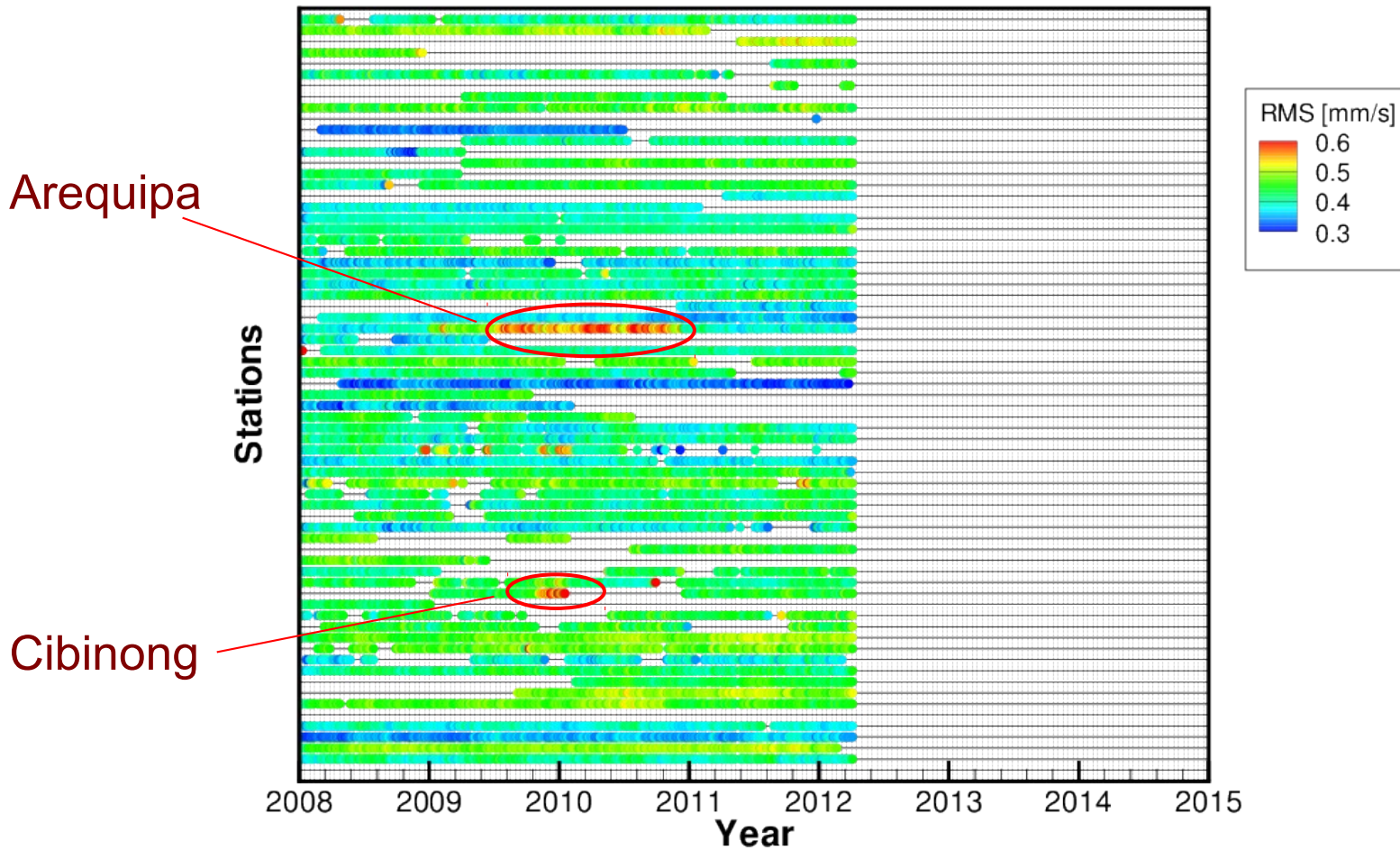
DORIS Orbit Determination

ENVISAT DORIS RMS



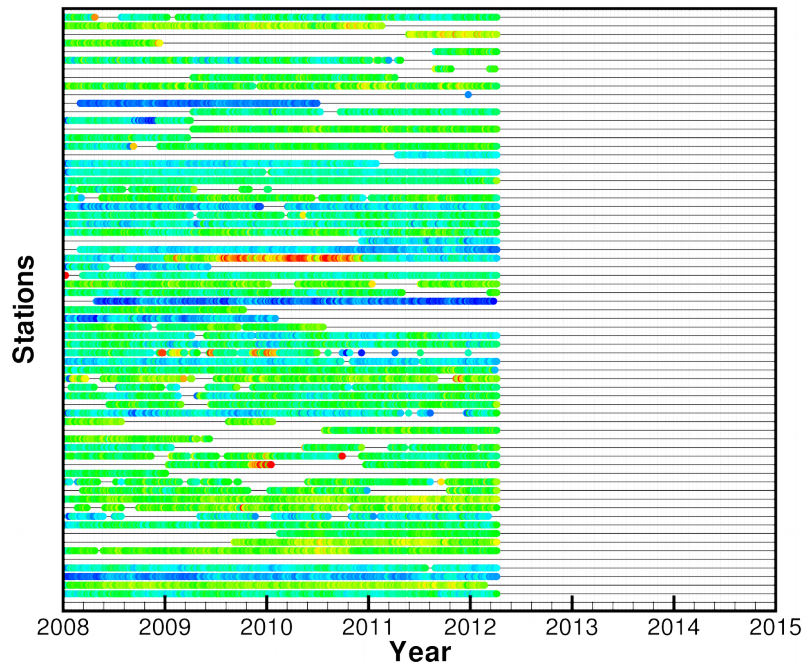
DORIS Orbit Determination

ENVISAT DORIS RMS

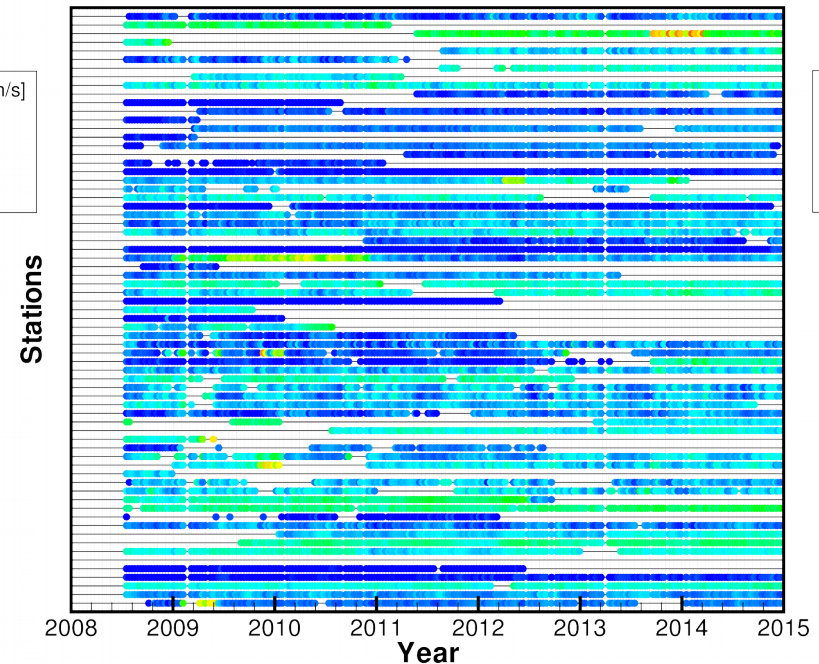


DORIS Orbit Determination

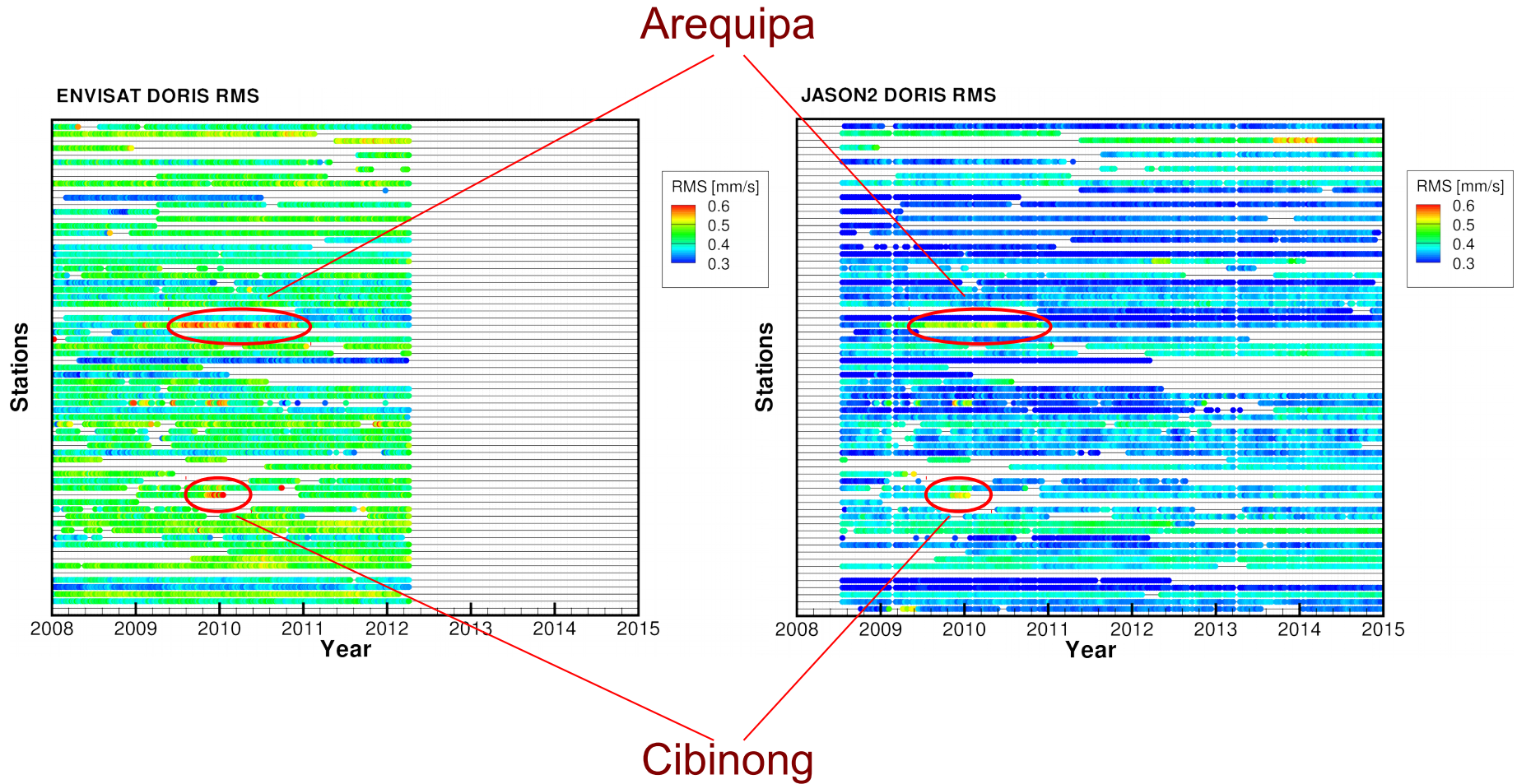
ENVISAT DORIS RMS



JASON2 DORIS RMS

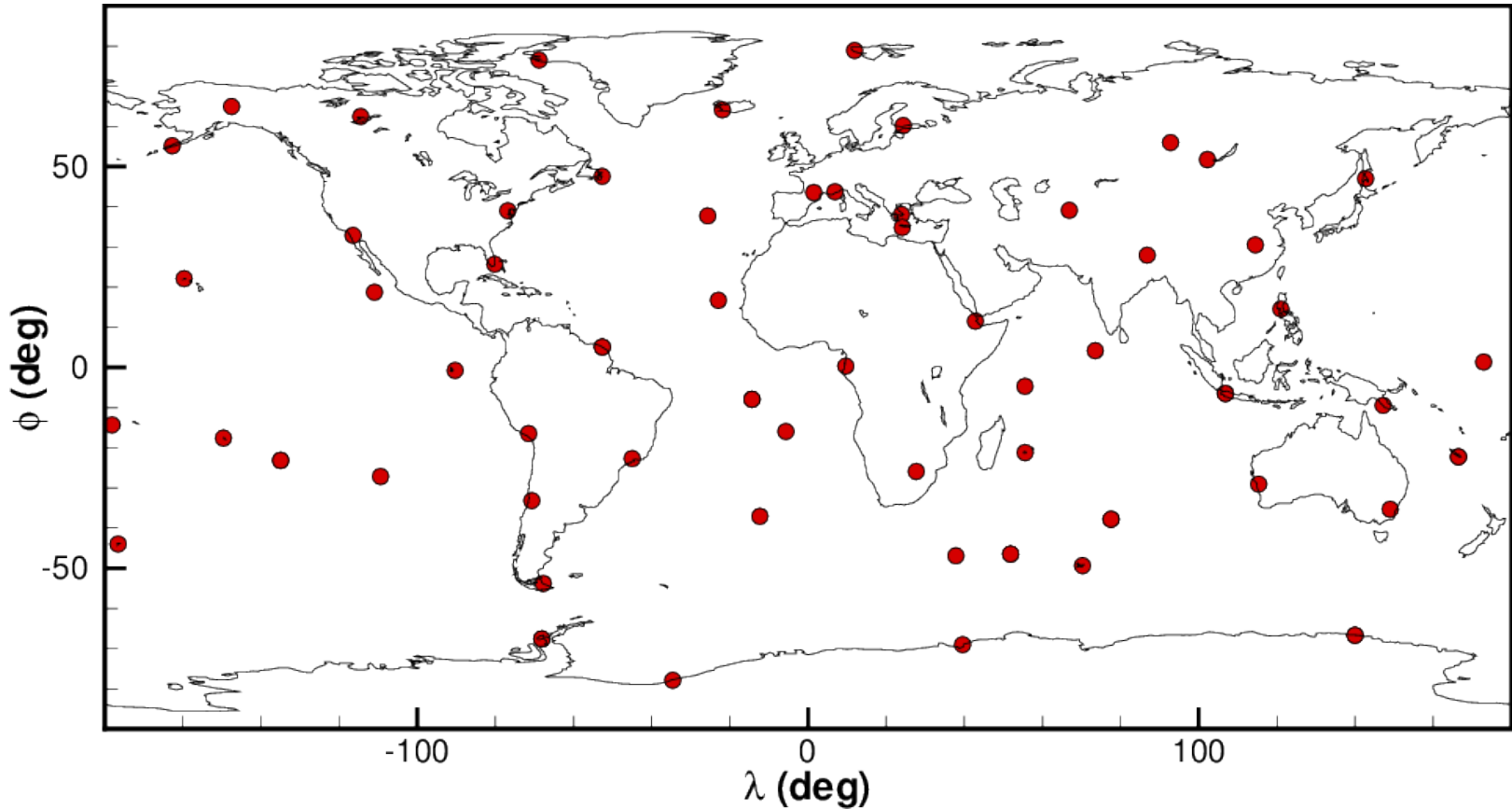


DORIS Orbit Determination



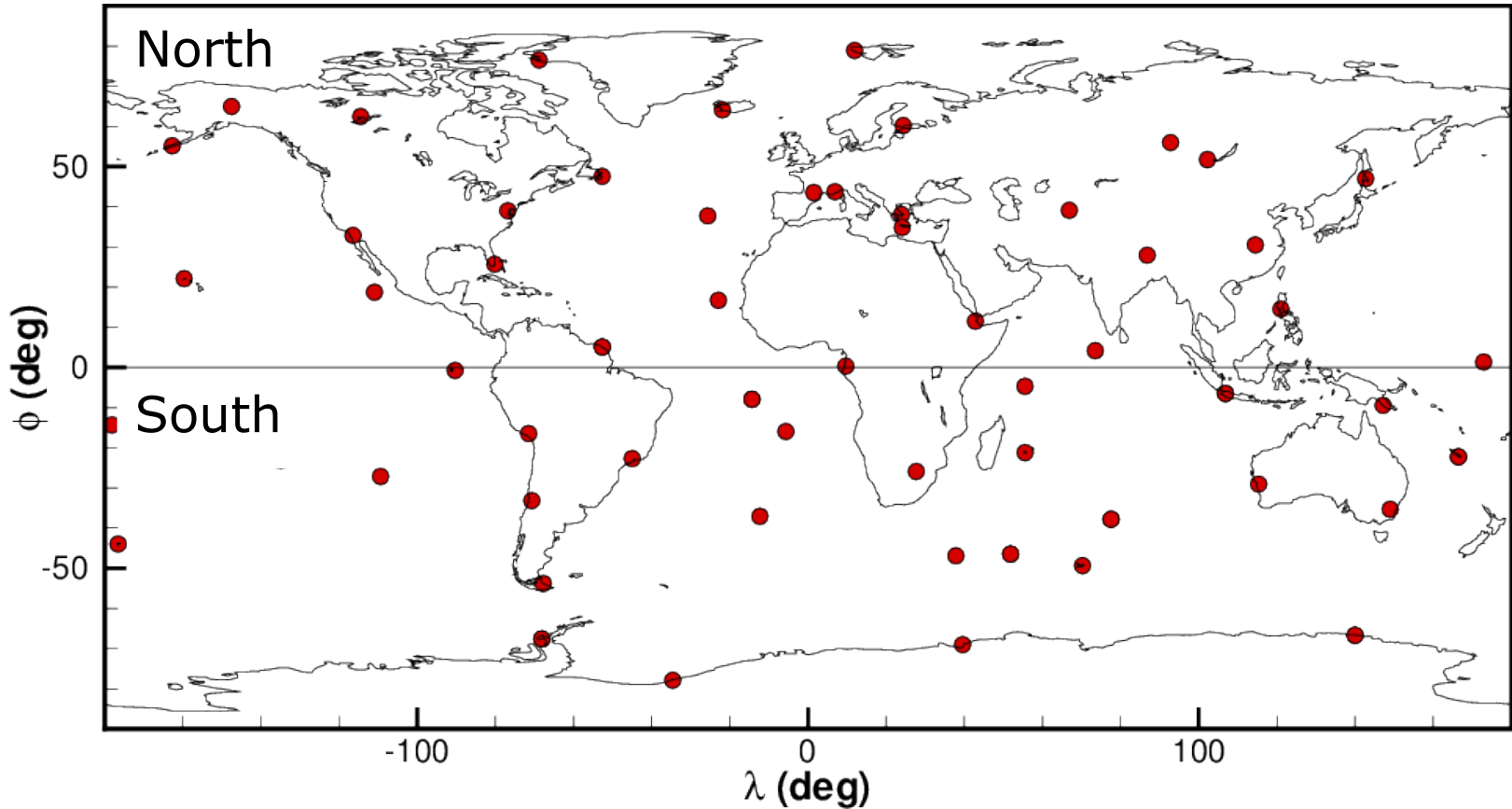
The DORIS Network

- Sites 60
- Stations 69



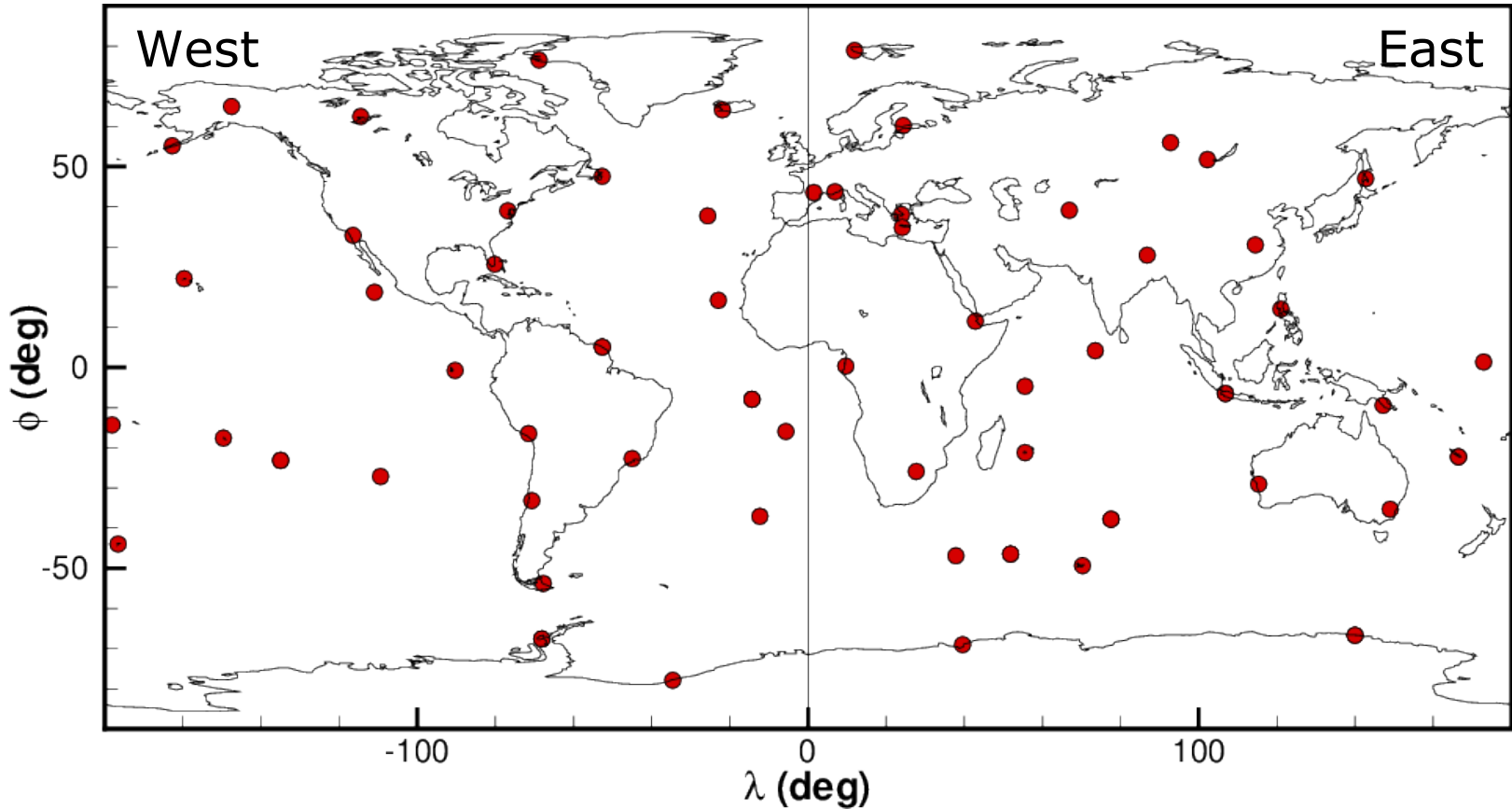
The DORIS Network

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- Stations 69



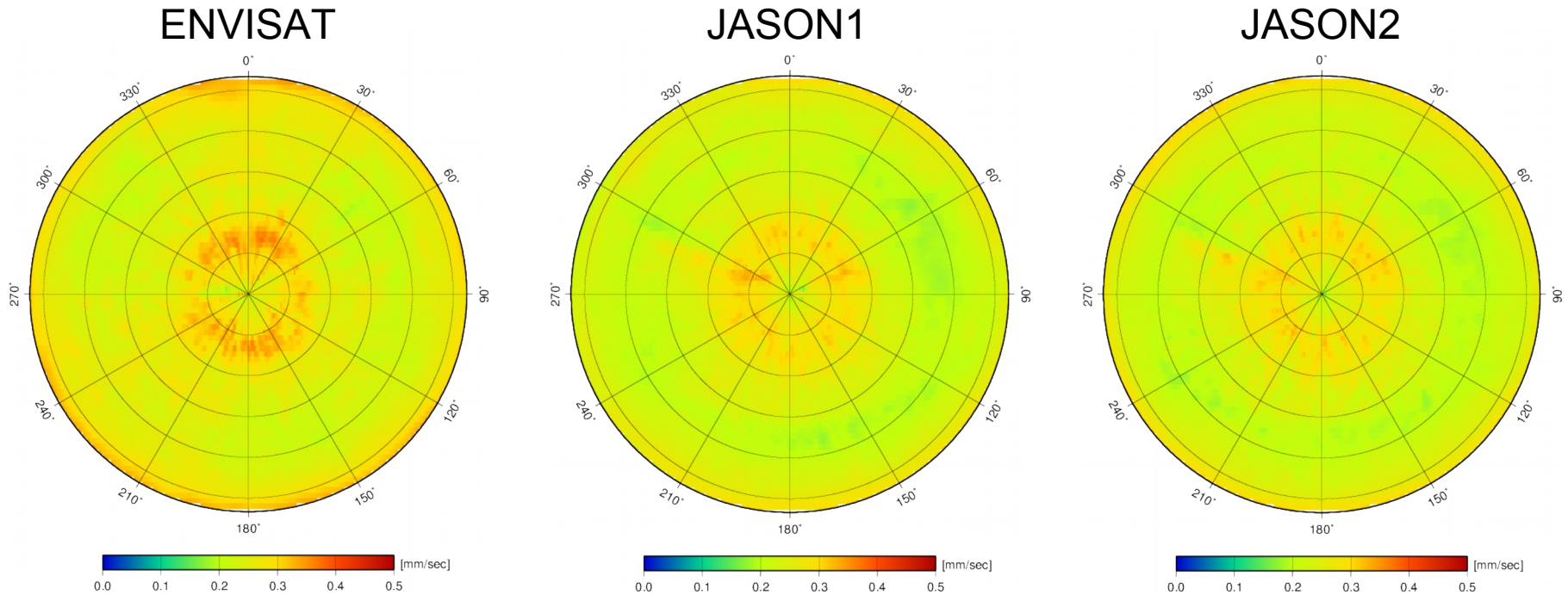
The DORIS Network

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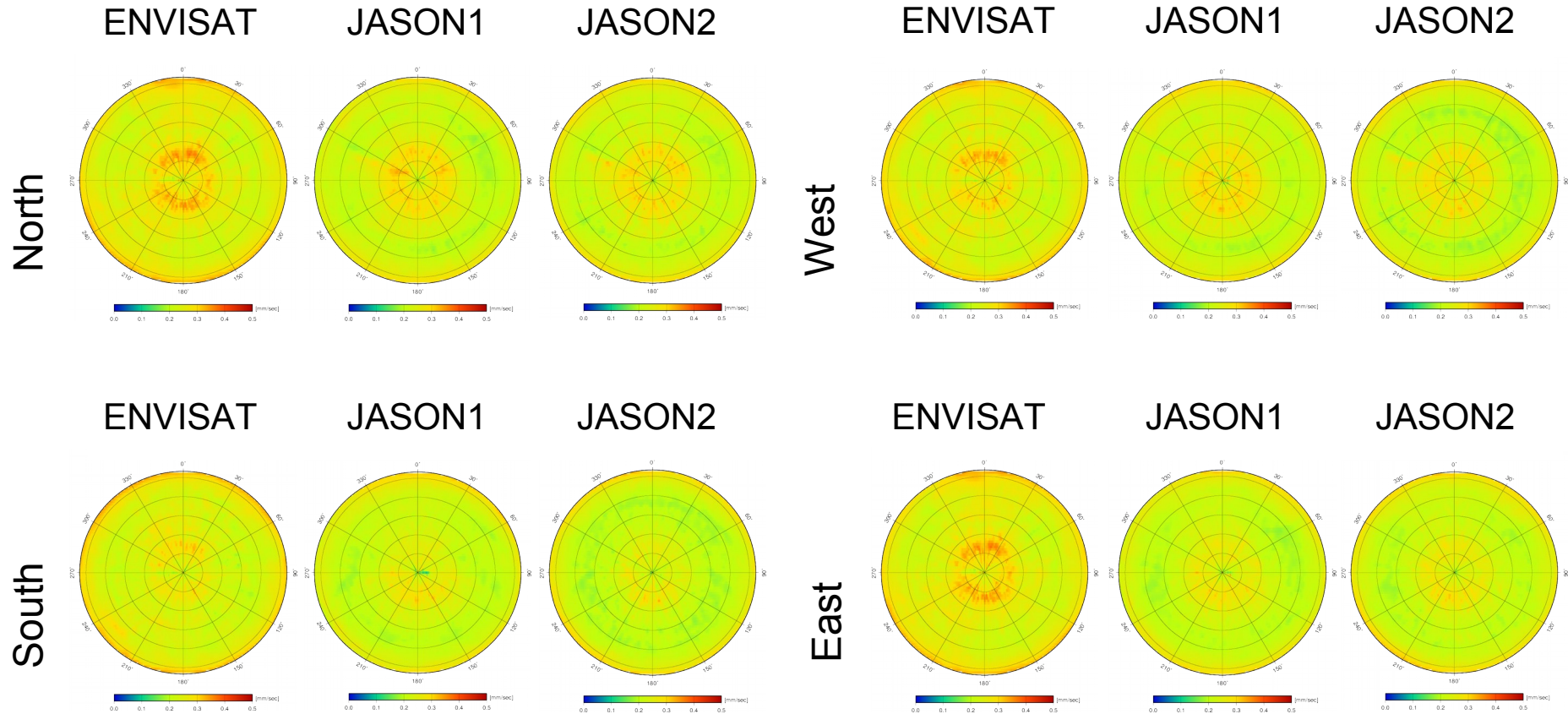
DORIS Orbit Determination

Standard deviation of DORIS residuals for region North:



DORIS Orbit Determination

Standard deviation of DORIS residuals for all regions:



Summary

- Real DORIS data have been evaluated to find out the stochastic properties of the observations
- The standard deviation of residuals is larger close to the horizon and around zenith
- The distribution of residuals is similar for all satellites, but amplitude for ENVISAT is higher
- Further plans:
 - Switch to 7-Day arcs according GPS weeks
 - Simulation of DORIS observations and generation of DORIS-only TRF

DORIS Orbit Determination

Estimated Parameters:

- Timebias per station
- Frequency bias per station
- Initial orbit elements
- Scale factor for troposphere refraction
- Scale factor for atmospheric drag
- Scale factor for solar pressure
- Empirical coefficients