

WP5. NRT and regional Service

Validation of daily GRACE products and preparation for NRT

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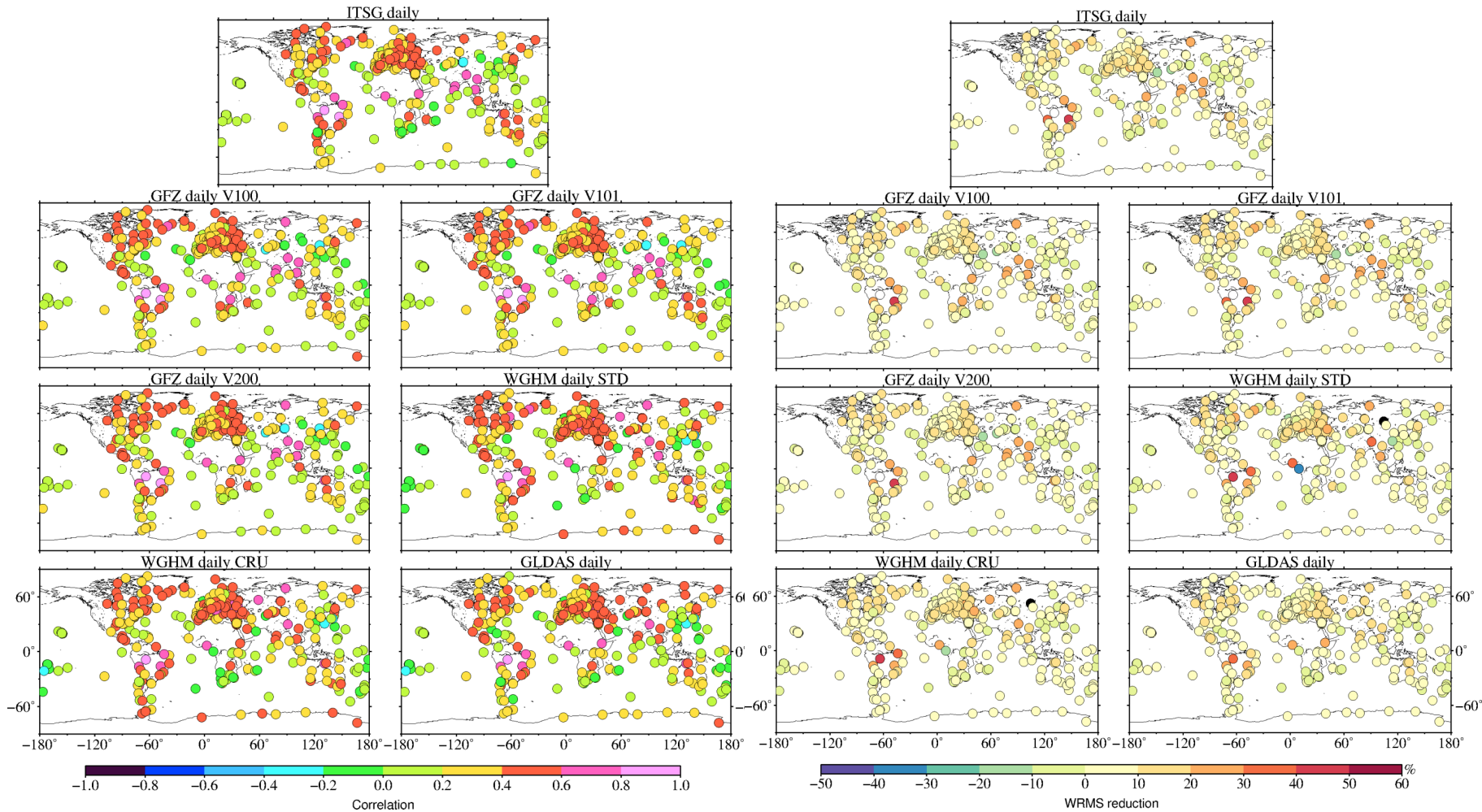
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Data

- GNSS data
 - Reprocessed daily UBERN GNSS time series (Repro3)
 - Cleaned, detrended, outlier and offsets removed
 - Latest daily ITRF2014 GNSS residuals (IGN)
 - Rigorously stacking the latest IGS repro2 solutions
- Continental Water Storage Models
 - GLDAS, daily
 - WGHM_2.2_STANDARD, latest official version, 2002-10/2010, daily
 - WGHM_2.2_STANDARD_CRU, 2002-12/2012, daily
 - a modification of 2.2standard, but not calibrated for the climate input
- Gravity models
 - Daily GRACE products from GFZ, version 100, version 101 and version 200
 - Daily GRACE products from ITSG2016

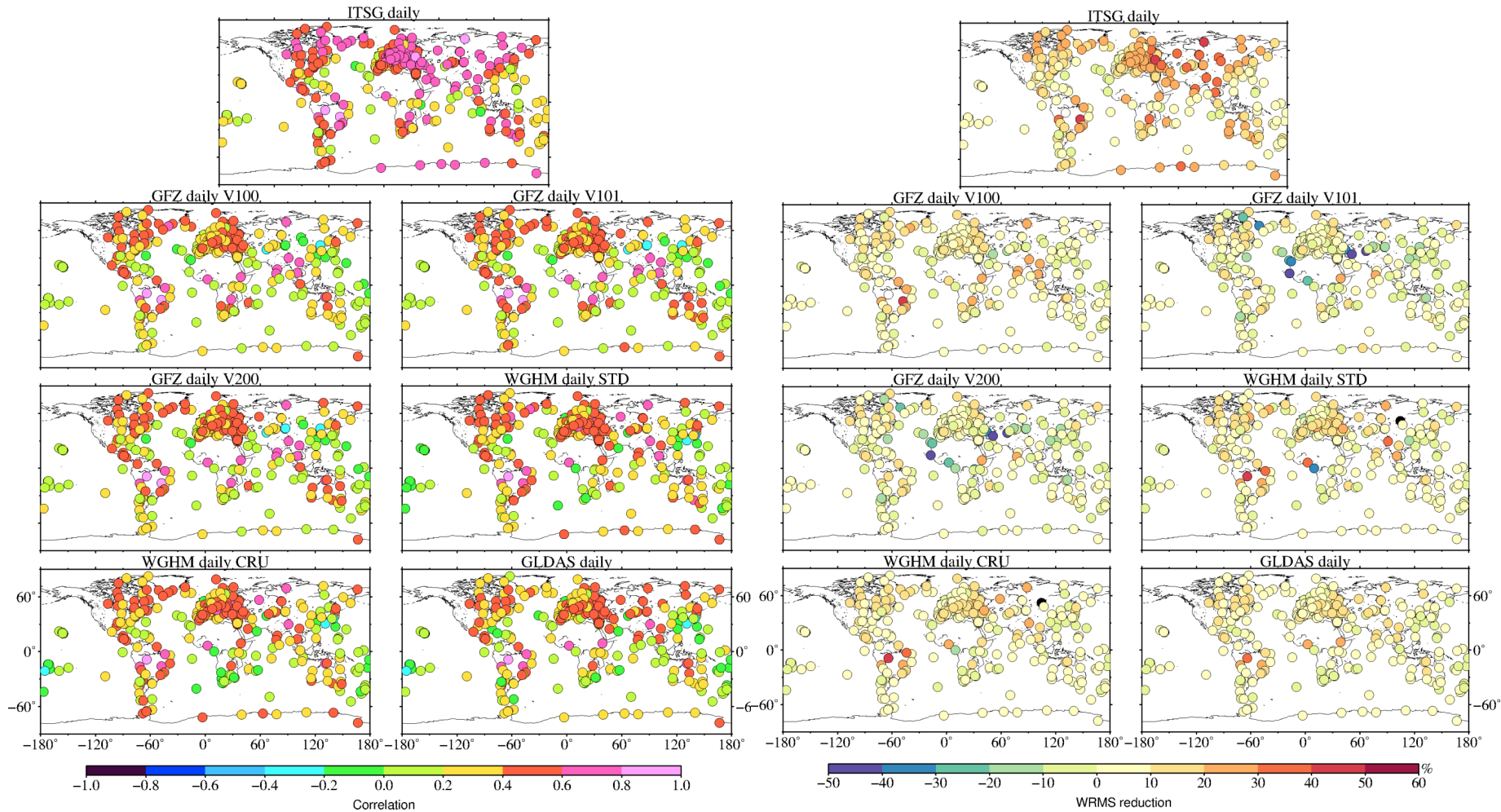
Validation with ITRF2014

- **Without** de-aliasing products: correlation (left) and WRMS reduction (right)



Validation with ITRF2014

- **With** de-aliasing products: correlation (left) and WRMS reduction (right)



Validation with ITRF2014

	WRMS reduction [%]				Positive WRMS reduction [%]
	min	max	mean	median	
GFZ V100	-16.45	63.42	5.79	4.31	84.52
GFZ V101 (without dealiasing)	-16.65	63.97	5.78	4.34	85.79
GFZ V200 (without dealiasing)	-17.33	64.12	5.52	4.00	82.23
ITSG (without dealiasing)	-17.32	64.21	6.10	4.88	84.77
ITSG (with dealiasing)	-12.80	66.45	14.73	14.47	93.40
GLDAS	-12.54	33.42	5.09	3.45	80.92
WGHM STD	-18.61	44.96	5.31	4.10	78.96
WGHM CRU	-14.83	42.80	5.53	4.44	84.48

- Both GFZ and ITSG daily GRACE models are better than hydrological models
- De-aliasing products are important in terms of daily solution validation

Preparation for NRT at ULux

- Automatic downloading and processing daily GRACE data is taking shape
 - Server for all the data: EGSIEM server?
- Question mark about GNSS data?
 - Latencies of JPL and SOPAC data
 - GNSS stations
 - Quality of UBERN rapid GNSS data

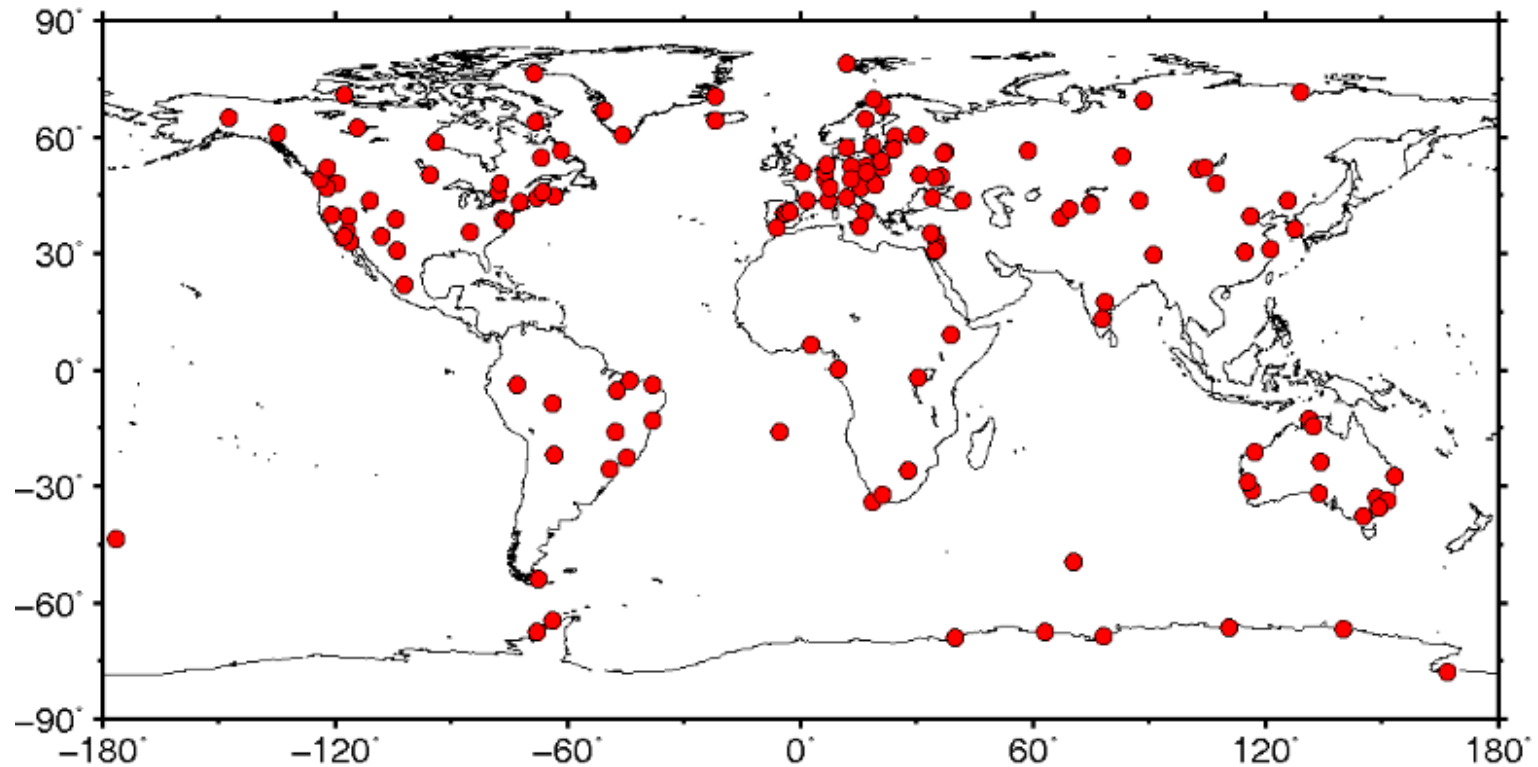
Preparation for NRT at ULux

- JPL and SOPAC GNSS time series with more than 12-day latency

File Name from JP and SOPAC	Update time	The Newest data	Latency (day)
GLB_Clean_DetrendNeuTimeSeries_jpl_20161104	11/4/16, 2:27:00 PM	2016.10.22	13
GLB_Clean_DetrendNeuTimeSeries_sopac_20161104	11/4/16, 8:09:00 PM	2016.10.22	13
GLB_Clean_DetrendNeuTimeSeries_jpl_20161110	11/10/16, 2:56:00 PM	2016.10.29	12
GLB_Clean_DetrendNeuTimeSeries_sopac_20161110	11/10/16, 9:41:00 PM	2016.10.29	12
GLB_Clean_DetrendNeuTimeSeries_jpl_20161117	11/17/16, 9:23:00 PM	2016.11.05	12
GLB_Clean_DetrendNeuTimeSeries_sopac_20161118	11/18/16, 12:47:00 PM	2016.11.05	13
GLB_Clean_DetrendNeuTimeSeries_jpl_20161123	11/24/16, 1:23:00 AM	2016.11.12	12
GLB_Clean_DetrendNeuTimeSeries_sopac_20161124	11/24/16, 4:16:00 PM	2016.11.05	19
GLB_Clean_DetrendNeuTimeSeries_jpl_20161205	12/5/16, 12:04:00 PM	2016.11.19	15
GLB_Clean_DetrendNeuTimeSeries_sopac_20161205	12/5/16, 4:14:00 PM	2016.11.05	30
GLB_Clean_DetrendNeuTimeSeries_jpl_20161209	12/9/16, 4:28:00 PM	2016.11.26	13
GLB_Clean_DetrendNeuTimeSeries_sopac_20161209	12/9/16, 8:36:00 PM	2016.11.05	34
GLB_Clean_DetrendNeuTimeSeries_jpl_20161215	12/15/16, 1:29:00 PM	2016.12.03	12
GLB_Clean_DetrendNeuTimeSeries_sopac_20161215	12/15/16, 6:37:00 PM	2016.11.05	40
GLB_Clean_DetrendNeuTimeSeries_jpl_20161225	12/25/16, 3:55:00 PM	2016.12.10	15
GLB_Clean_DetrendNeuTimeSeries_sopac_20161225	12/25/16, 9:40:00 PM	2016.11.05	50
GLB_Clean_DetrendNeuTimeSeries_jpl_20161230	12/30/16, 9:16:00 PM	2016.12.17	13
GLB_Clean_DetrendNeuTimeSeries_sopac_20161231	12/31/16, 7:46:00 PM	2016.11.05	56
GLB_Clean_DetrendNeuTimeSeries_jpl_20170108	1/9/17, 12:45:00 AM	2016.12.24	16
GLB_Clean_DetrendNeuTimeSeries_sopac_20170109	1/9/17, 12:29:00 PM	2016.12.24	16
GLB_Clean_DetrendNeuTimeSeries_jpl_20170114	1/15/17, 2:48:00 AM	2016.12.31	15
GLB_Clean_DetrendNeuTimeSeries_sopac_20170115	1/15/17, 4:26:00 PM	2016.12.31	15

Preparation for NRT at ULux

- Pre-selected 155 GNSS stations
 - Low possibilities of offsets based on the processed reference frame data provided by UBERN



Preparation for NRT at ULux

- Further preparations to be done
 - Test the rapid GNSS position time series solutions from UBERN
 - Try to find an automatic way to deal with offsets in the GNSS time series
 - Try to find better metrics for validation results as WRMS reduction and correlation do not work in the NRT mode
 - Integrate the whole validation system

I expect your inputs and thank you for your attention!