Session 5

Improved Data QC at the Stations

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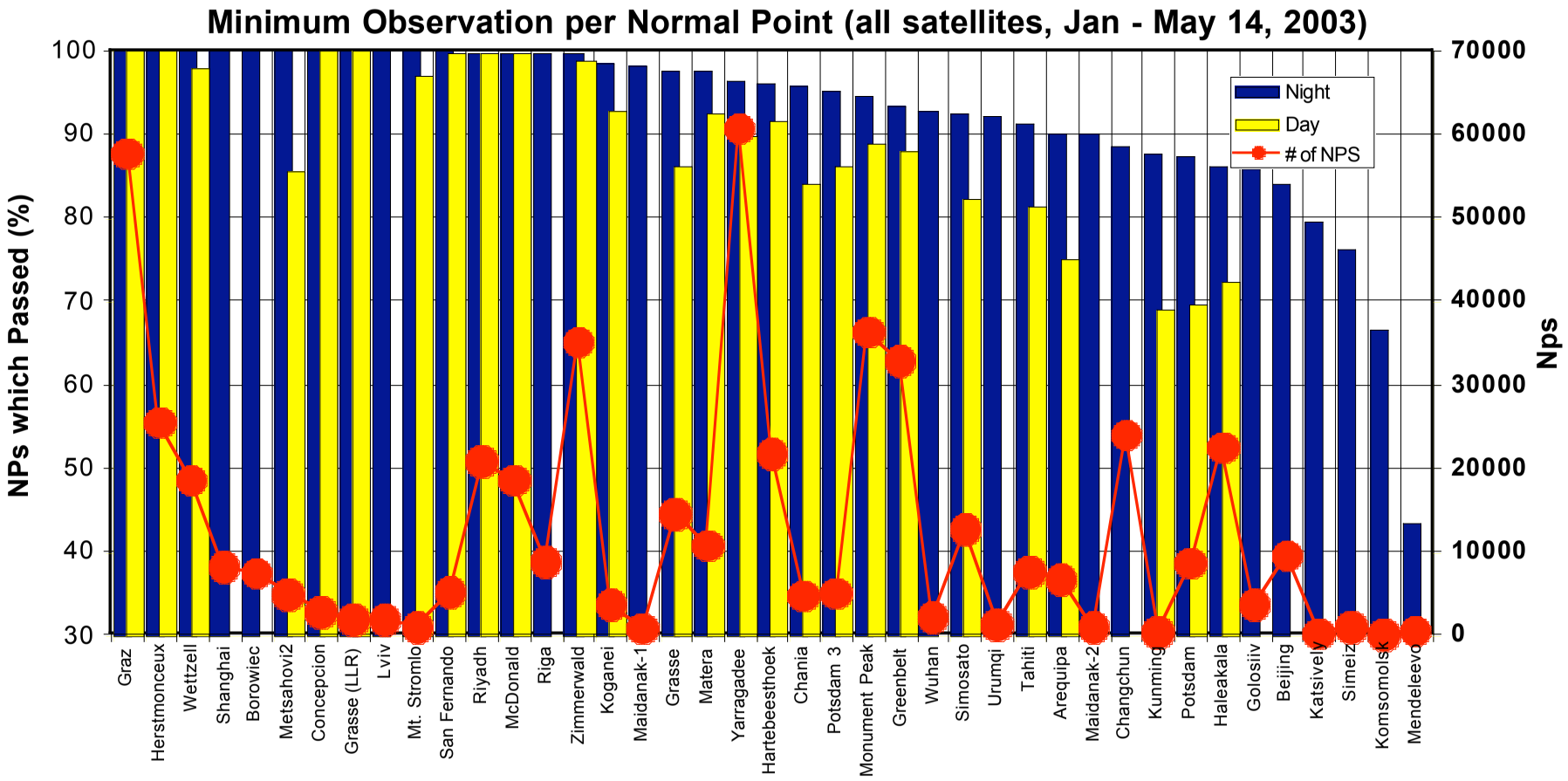
Background of Minimum Observation Per NP

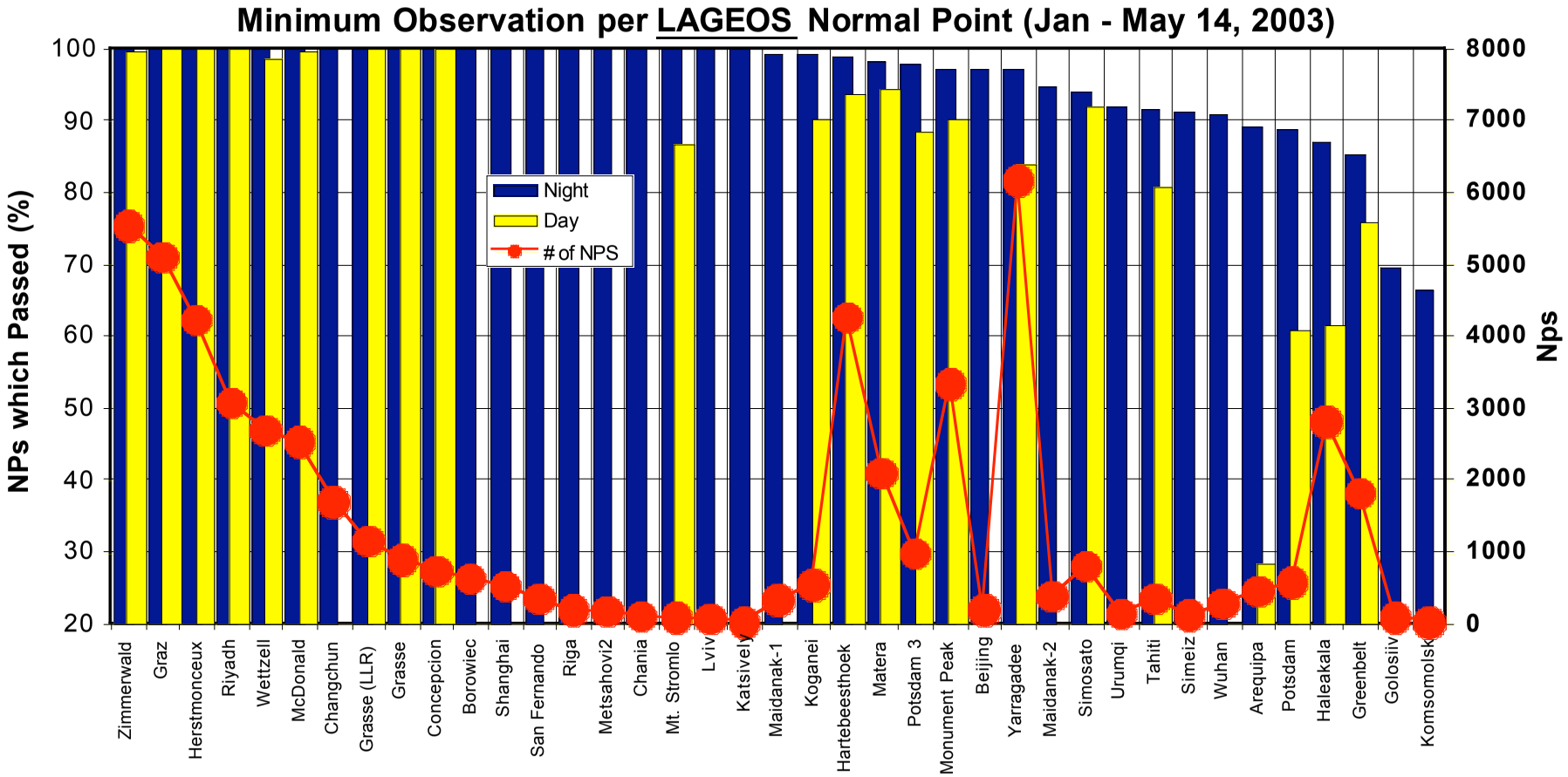
- In 1999, a study group of analysts (the 'Jaguar' Team) was tasked by the Data Format & Procedures Working Group to investigate this issue
- In Sep 1999, the Jaguar Team concluded the minimum observations/NP should be 1, otherwise valid data would be lost
- EUROLAS Workshop Recommendation (Mar 2002)
  - Minimum is 3 observations/NP for NIGHT
  - Minimum is 6 observation/NP for DAY
  - Exceptions
    - Very Low LEOS
    - Systems with low laser repetition rates
  - EUROLAS recommended this action be sent to the AWG, but prior to this being done it was presented and approved by the ILRS Governing Board

Minimum Observation Per NP
(all satellites)



All Satellites except CHAMP and GRACE, Jan 1 - May 14, 2003					
Site	**Day NPs**	**Night NPs**	**Total NPs**	**Day %**	**Night %**
Graz	17831	39817	57648	100.0	100.0
Herstmonceux	9647	15774	25421	100.0	100.0
Wettzell	9111	9331	18442	98.1	100.0
Shanghai	0	8067	8067		100.0
Borowiec	0	7330	7330		100.0
Metsahovi2	21	4835	4856	85.7	100.0
Concepcion	18	2728	2746	100.0	100.0
Grasse (LLR)	469	1315	1784	100.0	100.0
Lviv	0	1780	1780		100.0
Mt. Stromlo	525	387	912	97.1	100.0
San Fernando	2196	2826	5022	99.9	100.0
Riyadh	11656	9079	20735	99.7	99.9
McDonald	8228	10259	18487	99.7	99.9
Riga	0	8750	8750		99.8
Zimmerwald	14267	20740	35007	98.9	99.8
Koganei	1610	1963	3573	92.9	98.4
Maidanak-1	0	721	721		98.2
Grasse	2366	12078	14444	86.1	97.8
Matera	3739	6961	10700	92.6	97.6
Yarragadee	26268	34320	60588	89.8	96.6
Hartebeesthoek	8581	13093	21674	91.6	96.2
Chania	1606	3012	4618	84.1	95.8
Potsdam 3	219	4788	5007	86.3	95.3
Monument Peak	15986	20181	36167	88.9	94.6
Greenbelt	13463	19263	32726	88.0	93.5
Wuhan	0	2029	2029		93.0
Simosato	4102	8447	12549	82.4	92.6
Urumqi	0	1242	1242		92.1
Tahiti	2639	4782	7421	81.5	91.5
Arequipa	3044	3591	6635	75.2	90.2
Maidanak-2	0	853	853		90.2
Changchun	0	23824	23824		88.6
Kunming	29	303	332	69.0	87.8
Potsdam	2009	6574	8583	69.7	87.5
Haleakala	9439	12917	22356	72.4	86.3
Golosiiv	0	3576	3576		86.0
Beijing	0	9500	9500		84.2
Katsively	0	98	98		79.6
Simeiz	0	937	937		76.3
Komsomolsk	0	6	6		66.7
Mendeleevo	0	379	379		43.5

Minimum Observation Per NP (LAGEOS only)



LAGEOS, Jan 1 - May 14, 2003					
Site	**Day NPs**	**Night NPs**	**Total NPs**	**Day %**	**Night %**
Zimmerwald	3022	2512	5534	99.7	100.0
Graz	2099	2984	5083	100.0	100.0
Herstmonceux	2069	2145	4214	100.0	100.0
Riyadh	1995	1061	3056	99.9	100.0
Wettzell	1580	1103	2683	98.8	100.0
McDonald	1321	1195	2516	99.9	100.0
Changchun	0	1685	1685		100.0
Grasse (LLR)	345	803	1148	100.0	100.0
Grasse	109	775	884	100.0	100.0
Concepcion	10	704	714	100.0	100.0
Borowiec	0	618	618		100.0
Shanghai	0	512	512		100.0
San Fernando	0	330	330		100.0
Riga	0	178	178		100.0
Metsahovi2	0	153	153		100.0
Chania	0	99	99		100.0
Mt. Stromlo	46	24	70	87.0	100.0
Lviv	0	53	53		100.0
Katsively	0	6	6		100.0
Maidanak-1	0	313	313		99.4
Koganei	221	312	533	90.5	99.4
Hartebeesthoek	1209	3051	4260	93.9	98.9
Matera	925	1157	2082	94.5	98.5
Potsdam 3	78	887	965	88.5	98.0
Monument Peak	1359	1969	3328	90.2	97.5
Beijing	0	187	187		97.3
Yarragadee	1260	4893	6153	84.1	97.2
Maidanak-2	0	366	366		94.8
Simosato	178	618	796	92.1	94.3
Urumqi	0	128	128		92.2
Tahiti	26	318	344	80.8	91.8
Simeiz	0	104	104		91.3
Wuhan	0	272	272		91.2
Arequipa	21	414	435	28.6	89.1
Potsdam	23	537	560	60.9	89.0
Haleakala	1128	1667	2795	61.5	87.2
Greenbelt	526	1284	1810	75.9	85.5
Golosiiv	0	79	79		69.6
Komsomolsk	0	6	6		66.7

SLR Quality Control Data Release Criteria

- NASA SLR Data are Quality Controlled to ensure the release of "Good Data" by the following Gross editing Criteria:
  - Satellite RMS > 1000 picoseconds OR

    Calibration RMS > 300 picoseconds OR

    (Calibration Shift < 600 picoseconds or > 200 picoseconds) AND Calibration RMS > 67 picoseconds OR

    System Delay = 0 picoseconds
  - NASA SLR Data is edited from the pre-released data set and stations are notified of errors
- The Global SLR Data Set is also Monitored and Edited for Gross Format and Integrity Compliance errors
  - HTSI performs four separate Data Format checks and nine separate Data Integrity Checks on all SLR Data before daily release to the Data Centers (CDDIS and EDC)
  - Data is edited from the pre-released data set and stations are notified of errors
  - A detailed description of all Data and Integrity Compliance Checks can be found at the ILRS Web Site at:

http://ilrs.gsfc.nasa.gov/products_formats_procedures/normal_point/format_and_data_integrity.html

Data Validation

- Verification of data integrity is both a station and operations center responsibility
- Checks to be performed
  - ILRS Normal Point format
    - Pass separation line (i.e., 99999)
    - Valid header and data records
    - Single pass per header record
  - Data integrity compliance
    - Header record contains valid satellite ID, date, and SOD
    - Data records contain valid laser firing time, surface pressure, surface temperature, humidity
    - Normal point bin size valid for satellite and bin formulation based from 0 hours UTC
- Any data failing these checks (with the exception of bin size criteria) are not released to the data centers
- Operations centers notify stations when failures occur