SWOT Global Layover Modeling and Global Lake Observability from SWOT

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Research Questions

- ☑ What is distribution of SWOT layovers at continental and global scales?
- Where are locations of lakes likely to be observable by SWOT prior to launch?" in SWOT program announcement
 - How many lakes are well observable in 21-day cycle?
 - How many lakes are totally missed?
 - How many lakes are partially observed? And at what percentage?
 - How many times lakes are observed in one cycle?

June 27, 2017

Geometric Layover Simulation Results (P051)







>(250m)² Lake Observability: S. America

\blacksquare Area observation percentage

Observability	Lake #	#%	Lake Area	Area%
Completely missed (0%)	12,630	15	7,205,237,023	4
Poorly covered $(1 - 20\%)$	2,836	3	4,548,665,195	3
Moderately covered $(20 - 40\%)$	2,246	3	5,608,683,920	3
Fairly covered $(40 - 60\%)$	2,508	3	5,952,156,597	4
Well covered (60 – 80%)	3,650	4	25,185,468,342	15
Highly covered (80 – 99%)	9,618	12	72,251,264,279	44
Fully covered (100%)	49,728	60	42,800,154,013	26
Total	506,427	100	171,353,136,015	100

☑ Multiple observations

ObsTimes	Lake #	#%	Lake Area	Area%
0	11937	14	6,392,026,147	4
1	25844	31	16,888,490,170	10
2	41043	49	60,105,765,448	37
3	3792	5	24,496,152,408	15
4	596	1	47,959,518,271	29
5	2	0	5,653,180,882	3
6	2	0	2,056,496,043	1
Total	506,427	100	171,353,136,015	100

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Sensitive to DEM Noise in Russia (>60°N)



Summaries

- Layover effects are more severe at near ranges and sensitive to DEM quality.
- $\square > 45\%$ land areas are vulnerable to layover effects.
- ☑ Global lake observability in 21-day cycle.
 - $\sim 70\%$ lakes are well observed (>80% in area).
 - $\sim 50\%$ lakes are observed twice due to the ascending and descending orbits.
 - Larger lakes tend to be better observed owing to their open basins.
 - Many reservoirs tends to be less observed.