

GNSS Remote Sensing Colloquium 2023

Day	Time	Title
6/5 (overview)	8:30-8:45	Welcome
	8:45-9:45	Overview of GNSS remote sensing (RO, R, geodesy)
	9:45-10:00	Photos/Break/Informal Discussion
	10:00-11:00	Physics of atmospheric microwave propagation
	11:00-12:00	Introduction of GNSS systems and signals
	12:00-2:00	Working Lunch/Break/Informal Discussion
	2:00-3:00	GNSS theory, observation equation, and error sources
	3:00-3:20	Break/Informal Discussion
	3:20-5:00	Lab exercise: CDAAC website and products
	6/6 (Ground-based GNSS)	8:30-9:30
9:30-10:30		GNSS observation network and data/data centers
10:30-10:50		Break/Informal Discussion
10:50-11:50		Ground-based GNSS atmospheric sensing
11:50-2:00		Working Lunch/Break/Informal Discussion
2:00-3:00		Ground-based GNSS ionospheric sensing
3:00-3:20		Break/Informal Discussion
3:20-5:00		Lab exercise: CDAAC GNSS RO data processing chain (level 0 - level 1b)
6/7 (Radio occultation I)	8:30-9:30	Introduction of GNSS radio occultation (RO)
	9:30-10:30	RO inversions I - excess phase
	10:30-10:50	Break/Informal Discussion
	10:50-11:50	RO neutral atmospheric inversions II - bending angle and refractivity
	11:50-2:00	Working Lunch/Break/Informal Discussion
	2:00-3:00	RO neutral atmospheric inversions III - atmospheric parameters
	3:00-3:20	Break/Informal Discussion
	3:20-5:00	Lab exercise: CDAAC GNSS RO data processing chain (level 1b - level 2)

6/8 (Radio Occultation II)	8:30-9:30	Sensing the ionosphere with GNSS RO (measurement and inversion)
	9:30-10:30	Accuracy assessment of ionospheric RO retrievals
	10:30-10:50	Break/Informal Discussion
	10:50-11:50	Study of ionospheric scintillation using GNSS measurements
	11:50-2:00	Working Lunch/Break/Informal Discussion
	2:00-3:00	Polarimetric GNSS RO technique to sense heavy precipitation
	3:00-3:20	Break/Informal Discussion
	3:20-5:00	Lab exercise: Using Python to analyze CDAAC netCDF products
6/9 (GNSS-R)	8:30-9:30	Introduction of GNSS reflectometry (GNSS-R)
	9:30-10:30	Application of GNSS-R data in the ocean field
	10:30-10:50	Break/Informal Discussion
	10:50-11:50	Soil moisture monitoring using GNSS-R data
	11:50-2:00	Working Lunch/Break/Informal Discussion
	2:00-3:00	GNSS-R altimetry
	3:00-3:20	Break/Informal Discussion
	3:20-5:00	Lab exercise: release of lab practices (sub-groups): 1. Studies of tropopause or PBL using RO data; 2. RO data assimilation; 3. Studies of ionosphere using RO data; 4. RO climate data record; 5. Studies the soil moisture using GNSS-R data
Weekends		
6/12 (Science Applications in neutral atmosphere)	8:30-9:30	Large- and small-scale thermal variability derived from RO data
	9:30-10:30	PBL detection using RO data
	10:30-10:50	Break/Informal Discussion
	10:50-11:50	Atmospheric river study using RO
	11:50-1:30	Working Lunch/Break/Informal Discussion
	1:30-2:30	Climate monitoring using RO
	2:30-3:30	Using GNSS RO data to validate & calibrate other datasets
	3:30-3:45	Break/Informal Discussion

	3:45-5:00	Lab exercise
6/13 (Science Applications in Ionosphere)	8:30-9:30	Studies of ionospheric structures, variabilities and dynamics using ionospheric RO data
	9:30-10:30	Detection of ionospheric irregularities using GNSS RO data
	10:30-10:50	Break/Informal Discussion
	10:50-11:50	Mapping the topside ionosphere and plasmasphere using GNSS data
	11:50-1:30	Working Lunch/Break/Informal Discussion
	1:30-2:30	Study of atmosphere-ionosphere coupling using GNSS data
	2:30-3:30	Ionospheric assimilation of RO and ground-based GNSS data
	3:30-3:45	Break/Informal Discussion
	3:45-5:00	Lab exercise
6/14 (Data assimilation)	8:30-9:30	Overview of data assimilation
	9:30-10:30	Errors in RO retrievals
	10:30-10:50	Break/Informal discussion
	10:50-11:50	Assimilation and impact of RO observations
	11:50-2:00	Working Lunch/Break/Informal discussion
	2:00-3:00	Assimilation and impact of RO observations on cyclone prediction
	3:00-3:20	Break/Informal discussion
	3:20-5:00	Lab exercise
6/15 (Challenges and Future developments)	8:30-9:30	Challenges in RO measurements
	9:30-10:30	Water vapor monitoring with (LEO-LEO) RO
	10:30-10:50	Break/Informal discussion
	10:50-11:50	Opportunities and challenges in GNSS-R
	11:50-2:00	Working Lunch/Break/Informal discussion
	2:00-3:00	GNSS remote sensing: current status and future perspective
	3:00-3:20	Break/Informal discussion
	3:20-5:00	Lab exercise

6/16 (Student presentations)	8:30-10:30	Student presentations (3 groups, 40min/group)
	10:30-10:50	Break/Informal discussions
	10:50-12:10	Student presentations (2 groups)
	12:10-2:00	Working Lunch
	2:00-	Extended discussions of challenges/opportunities/research directions