2022 Workshop: Lidar Science and Technology

Long title
Recent progress of lidar science and technology CEDAR workshop
Conveners
T. Yuan
Jintai Li
Richard Collins
titus.yuan@usu.edu
Description

Utilizing different light scattering processes by the atmospheric species, the lidar technique has the capabilities of observing neutral temperature, winds in the middle and upper atmosphere with broad range of temporal and spatial resolutions. The data can, thus, be utilized for various scientific investigations by the CEDAR scientists. When collaborating with the other instruments and model simulations, the lidar technique can address some of the most complex dynamic and chemical processes highlighted in the CEDAR community.

Agenda

Welcome (10:00-10:02)

Joe She: Lidar detection sensitivity and (T,V) measurement uncertainties (10:02-10:15)

Rich Collins: Development of Nd:YAG-based resonance iron lidar system (10:15-10:28)

Jintai Li: A case study of secondary gravity wave using lidar and reanalysis data (10:28-10:41)

Jens Lautenbach: Optical lantern techniqe and its applications to lidar (10:41-10:54)

Xinzhao Chu: Surprising Results of Sensible Heat and Meteoric Na Fluxes in the MLT Measured by Lidar at McMurdo, Antarctica (10:54-11:07)

Yang Fan: Bias correction for atmospheric instability (11:07-11:20)

Biff Williams: KHI and other instabilities observed in Poker Flat sodium wind-temperature lidar data and PMC imaging (11:20-11:33)

Neal Criddle: Automatic wave package detection and analysis (11:33-11:46)

Titus Yuan: MIGHTI lidar study on turbopause tide (11:46-11:59)

Closing remarks: (11:59-12:00)

Justification

The lidar techniques, such as Rayleigh lidar and resonant fluorescence lidar, have greatly advanced the understanding of upper atmospheric dynamics and chemistry over the past a few decades. With the recent developments, updates and extended capabilities, the new lidar measurements, coupled with other advanced remote sensing instruments, are expected to further benefit the community's investigations on various critical processes involving energy and momentum transfer between distinct sections of the atmosphere. These processes include but not limited to the coupling and interaction processes between the lower and upper atmosphere, as well as those between the neutral atmosphere and ionosphere in the D and E region. Therefore, the lidar contributions are perfectly aligned with the CEDAR Strategic Thrust #2: Explore Exchange Processes at Boundaries and Transitions in Geospace and thrust #4: Develop Observational and Instrumentation Strategies for Geospace System Studies. This workshop aims to highlight the latest lidar science and technology achievements, including collaborative studies with other instruments, and looking forward to the future collaborative campaigns with the surrounding instruments to address new challenging science topics.

Related to CEDAR Science Thrusts:
Explore exchange processes at boundaries and transitions in geospace
Develop observational and instrumentation strategies for geospace system studies
View PDF