Antti
Mikkonen
Finnish Meteorological Institute
Hannakaisa Lindqvist, Finnish Meteorological Institute
Vijay Natraj, Jet Propulsion Laboratory
Janne Nurmela, Finnish Meteorological Institute
Johanna Tamminen, Finnish Meteorological Institute
Poster
Recent and upcoming satellite missions produce orders of magnitude more data than previous missions in all temporal, spatial and frequency domains. This development requires us to rethink the way how we refine the observations into higher level data products. One avenue is to examine how radiative transfer could be solved for multiple pixels simultaneously.

In recent hyperspectral imaging instruments, such as EMIT and PRISMA, as well as greenhouse gas (GHG) emission focused instruments like GHGSat, the ground pixel size is considerably small compared to previous GHG observing satellite instruments. Thus the atmospheric content of neighbouring pixels can affect each other due to scattering and they are not fully independent from each other. Partial cloud cover, emission plumes and large solar zenith angles further increase the effects of neighbouring pixels.

In this work we present a novel approach to 3D atmospheric radiative transfer. In principle, it is a hybrid method which combines ray-tracing and discrete ordinates solutions by adaptively creating a scattering graph based on atmospheric and instrument properties. By solving the radiative fluxes within the graph, we can simulate radiative transfer in multiple pixels at the same time. This method enables even more sophisticated modeling of atmospheric radiative transfer and can open up new avenues of observation in remote sensing context.
Meeting homepage
IWGGMS-20 Workshop
Download to PDF