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The Hong Kong University of Science and Technology

Department of Mathematics and Division of Environment and Sustainability

Joint Seminar

Air Quality in East Asia seen by Geostationary Earth Orbit Satellites

by

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Abstract

Aerosol property retrieval from geostationary earth orbit(GEO) satellite has been available with visible channel onboard conventional meteorological imager including GOES, METEOSAT, MTSAT and COMS. With the advent of next-generation, meteorological and ocean color imager onboard GEO platforms, aerosol properties became available in unprecedented temporal and spatial resolution. Multiple channels in visible and near IR from GEO satellite instruments with full disk imaging in 10 minutes made it possible to track fine structures of aerosol plumes in km resolution. These GEO aerosol products were validated successfully through extensive field campaigns including DRAGON-NE Asia in 2012, KORUS-AQ in 2016 and EMERGE-Asia in 2018. Their validation against ground-based AERONET show comparable statistics with those of low Earth orbit(LEO) products. A machine learning algorithm was developed to estimate surface PM2.5 using aerosol products from Geostationary Ocean Color Imager(GOCI). Due to high demands for data assimilation, these GEO products are now available in near real time. Application of the GEO dataset has been extended to surface PM retrieval, air quality forecast through data assimilation, and public health studies.

However, no observations of trace gases at high temporal resolution from GEO have been made to complement those of aerosol properties to date. Geostationary Environment Monitoring Spectrometer (GEMS) onboard GK-2B satellite is to be launched no later than March 2020. GEMS is a UV-visible scanning spectrometer, which covers most of Asia region with a nominal spatial resolution of 7 x 8 km2 at Seoul. Baseline products of GEMS includes aerosol, ozone and their precursors such as NO2, SO2, HCHO, and CHOCHO. GEMS together with GOCI-2 can add absorbing aerosol information by using UV channels and aerosol layer height information by using O2O2 absorption, in addition to measurements of aerosol precursors including NO2, SO2, HCHO etc. New era of GEO observation of aerosol properties is to be realized in early 2020s and are to be expanded in many different areas of application, including studies on urban air quality, long range transport, emission hot spots, public health, crop yield and so on.

Date: **Tuesday, 2 July 2019**

Time: **2:30p.m. - 3:30p.m.**

Venue: **Room 4472 Academic Building, (Lifts 25-26), HKUST**

All are welcome!