KORUS-AQ Assets Part I

These slides outline the major Korean and US assets available for May – June 2016 Field Campaign focused on the Korean Peninsula and surrounding waters.

Barry Lefer, Jeong-Hoo Park, Gangwoong Lee

NASA Contributions to KORUS-AQ: An International Cooperative Air Quality Field Study in Korea

US Steering Group: Jassim Al-Saadi, Gregory Carmichael, James Crawford, Louisa Emmons, and Saewung Kim

Korean Steering Group: Chang-Keun Song, Lim-Seok Chang, Gangwoong Lee, Jhoon Kim, and Rokjin Park

Funding was applied primarily to instrument the DC-8 Aircraft with limited funds for additional ground measurements and modeling support.

Overview of KORUS-AQ Assets

Aircraft
- NASA DC-8
- NASA King Air
- Hanseo Univ. King Air
- KMA King Air

Ship
- KIOST R/V Onnuri
- KMA R/V Kisang I

Ground
- MoE National Network
- Research Sites (Univ., NIER, KMA)
- CIMEL/Pandora

Model Forecast Support

KORUS-AQ DC-8 Measurement PI Team (Part 1 of 3)

Ahn, Joon-Young (NIER)	Airborne Measurements of Black Carbon Mass during KORUS-AQ
Anderson, Bruce (LaRC)	AN AIRBORNE INVESTIGATION OF AEROSOL AND CLOUD PROPERTIES IN SUPPORT OF KORUS-AQ
Blake, Don (UC-Irvine)	Whole Air Sampling (WAS) From the NASA DC-8 Aircraft During the KORUS-AQ Field Campaign
Brune, Bill (Penn State)	KORUS-AQ oxidation chemistry: DC-8 measurements of OH, HO2, and OH reactivity
Cohen, Ron (Berkeley)	Nitrogen oxide chemistry over the Korean peninsula: Comparing in situ observations with remote sensing
Dibb, Jack (UNH)	UNH SAGA contribution to DC-8 payload for KORUS AQ
Diskin, Glenn (LaRC)	Airborne Measurements and Analysis of H2O(v), CO, CH4, and N2O in support of the KORUS-AQ Field Campaign
Fried, Alan (Univ CO)	Fast Airborne Measurements of Formaldehyde and Ethane on NASA's DC-8 Employing an Infrared Absorption Spectrometer During the KORUS-AQ Study

KORUS-AQ DC-8 Measurement PI Team (Part 2 of 3)

Hair, John (LaRC)	Airborne Lidar Investigations of Ozone, Aerosol, and Clouds as Part of KORUS on the NASA DC-8
Hall, Sam (NCAR)	Airborne actinic flux measurements and photolysis frequencies in support of KORUS-AQ science
Hanisco, Tom (GSFC)*	In Situ Airborne Formaldehyde (ISAF) measurements for KORUS
Huey, Greg (GIT)	Collaborative Ground and Airborne Observations of Reactive Nitrogen, Halogens, and SO2 during the KORUS-AQ campaign
Janz, Scott (GSFC)**	GeoTASO Measurements of Aerosols and Tropospheric NO2, O3, CH2O, and SO2 Vertical Column Density (VCD) in support of KORUS-AQ
Min, Kyung-Eun (GIST)	Airborne measurements of HONO and NO2 using Cavity Enhanced Absorption Spectroscopy.
Lee, Sang-Deog (NIER)	Airborne Observations of Reactive Nitrogen and SO2 during the KORUS-AQ campaign
Jimenez, Jose (Univ CO)	Aerosol Mass Spectrometer Measurements on the DC8 during KORUS-AQ to Study Secondary Aerosol Sources, Formation and Aging
Park, Jeong-Hoo (NIER)	Airborne PTR-ToF-MS measurements of NMHCs on the DC-8 during KORUS-AQ

KORUS-AQ DC-8 Measurement PI Team (Part 3 of 3)

Park, Jinsoo (NIER)	Aerosol Mass Spectrometer Measurements on the DC-8 during KORUS-AQ
Redemann, Jens (ARC)	Airborne measurements of multi-spectral optical depth and retrievals of trace gas column contents and aerosol properties from 4STAR during KORUS-AQ
Schwarz, Joshua (NOAA)	Measurements of Black Carbon Mass and Mixing State, and the Hygroscopicity of Internally Mixed Materials During KORUS-AQ
Weinheimer, Andy (NCAR)	Measurements of NO, NO2, NOy, and O3 from the DC-8 During KORUS-AQ
Wennberg, Paul (CIT)	Peroxides, Acids, and Organic Oxygenates for KORUS
Wisthaler, Armin (Innsbruck)	PTR-ToF-MS measurements of NMHCs in support of KORUS-AQ
Yang, Melissa (LaRC)***	DC-8-based Observations of Atmospheric CO2 in Support of the KORUS-AQ Regional Studies
Yum, Seong Soo (Yonsei Univ)	Airborne measurements of CCN on the DC-8 during KORUS-AQ

KORUS-AQ Ground Measurement PI Team

Eloranta, Edwin (Wisc)	HSRL DEPLOYMENT TO SEOUL, SOUTH KOREA
Herman, Jay (UMBC)	PANDORA Deployment to South Korea for KORUS-AQ
Holdben, Brent (GSFC)	Enhanced AERONET Network in South Korea for KORUS-AQ
Thomas McGee (GSFC)	KORUS-AQ Ozone LIDAR Measurements
Thompson, Anne (GSFC)	KORUS-AQ Ozonesonde Measurements
Korean Air Quality Measurement Sites	

KORUS-AQ Forecasting PI Team

Carmichael, Gregory (Iowa)	Regional Scale Modeling in Support of KORUS-AQ: Improving Predictions of Dynamic Air Quality Using Aircraft, Ground Networks, and Satellite Data
Emmons, Louisa (NCAR)	Global and Regional Chemical Forecasting and Analysis using CAM-chem, Data Assimilation and WRF-Chem for KORUS-AQ
da Silva, Arlindo (GSFC)	GEOS-5 Chemical and Meteorological Forecasting Support for the KORUS-AQ Campaign
Hyer, Edward (NRL)	Advanced geostationary and lidar satellite data exploitation in support of KORUS-AQ mission planning and forecasting
Korean Air Quality and Meteorological Modeling Teams	

KORUS-AQ King Air (LaRC)

GeoTASO (TEMPO/GEMS Airborne Simulator)

Geostationary Trace gas and Aerosol Sensor Optimization

NASA-funded airborne sensor and trace gas/aerosol retrieval project to advance mission readiness of sensor/algorithms for GEO-CAPE/TEMPO missions

- UV-Vis spectrometer with 2 2-D detector arrays covering 290-390 nm (O_3, SO_2, HCHO) and 415-695 nm (NO_2, O_3, aerosol)
  - Imaging spectrometer covers ~8 km swath with 50 m x 80 m ground patch resolution
  - Spectral passbands of ~ 0.4 nm in UV, ~0.8 nm in Vis with 3x oversampling spectrally
  - Signal to noise of ~ 50 for individual samples

Hanseo Univ. King Air

Ozone
VOCs Speciation
NO2 – CAPS
CO
SO_2
Meteorology
Small formaldehyde from NASA added

KMA King Air

CCN
Cloud droplet distribution
SP2
OPC
O3
NO,NOx,NOy
SO2
CH4
CO
CO2
H2O, LWC, Total water
Dropsonde
Nephelometer
AIMMS 20 (Winds)
Microwave radiometers (SFMR, GVR)
T, Dew Point, winds

KIOST R/V Onnuri

Pandora (NO_2 and O_3 Column)
Insitu Trace Gases (e.g., NO_2, O_3, etc)
Aerosol Composition
Aerosol Size Distribution
Aerosol Optical Properties

Areas of Operations?

KMA R/V Kisang I

Ozone
PM2.5 (mass and chemical composition) - PILS
Aerosol number and size distribution
NO/NOx/NOy
PAN
HONO
CO
SO_2
BVOCs and OH Reactivity (PTRMS)
Aerosol Scattering and Absorption
Meteorology – AWS and radiosonde

Dates and Areas of Operations?

Can MBL structure be measured? Twice a day radiosonde launches provide this.

Research Sites (Univ., NIER, KMA)

Pre-campaign Sites:

- Baengnyeong Island
- Yonsei University
- HUFS
- GIST
- Anmyeon
- Busan University

Other Operational Sites:

- LIDAR Network
- MoE National Network

Model Forecast Support

NIER National Air Quality Forecast System

What else?