1 May – 14 June 2016
Osan Air Base, South Korea
https://espo.nasa.gov/home/korus-aq/content/KORUS-AQ

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Global Pollution Monitoring Constellation (2018-2020)

Policy-relevant science and environmental services enabled by common observations

- Improved emissions, at common confidence levels, over industrialized Northern Hemisphere
- Improved air quality forecasts and assimilation systems
- Improved assessment, e.g., observations to support United Nations Convention on Long Range Transboundary Air Pollution

Courtesy Jhoon Kim, Andreas Richter
Goals and Rationale

Science:
• Improve capability for satellite remote sensing of air quality
• Better understanding of the factors controlling air quality
• Test and improve model simulation of air quality

International Collaboration
Develop relationships that will enhance the global air quality satellite constellation including geostationary observations from TEMPO (NASA) and GEMS (KARI).

Capacity Building
Develop a stronger airborne science community in Korea through direct experience on the NASA DC-8 and participation in the planning of research flights.
Air quality trends and geography make Korea particularly interesting.

Land cover map indicates sharp distinction between urban and natural emissions.

Seoul Metropolitan Area has 25 million inhabitants, half of Korea’s population.

Rural regions are heavily forested.

Particle emissions have dropped in recent years, but O$_3$ and NO$_2$ continue to increase in Seoul.
Biogenic VOCs and NOx

MEGAN predictions of isoprene emissions sharply increased in mid-May
Anthropogenic NOx is not confined to Seoul – many power plants on east and south coasts
Anthropogenic VOCs are also important

Aromatics, and other anthropogenic VOCs, must also be considered as important ozone and SOA precursors
KORUS-AQ combined assets from the Korean and U.S. atmospheric science communities and their supporting organizations (NIER, NASA, Universities, etc.) to implement an integrated observing system for improving our understanding of Air Quality

GOCI (geostationary AOD), OMI (NO₂, O₃, AOD), MODIS (AOD), CALIPSO (aerosol profiles), MOPITT (CO), IASI (CO, O₃, et al.), etc.

Model evaluation and improvement, chemical process understanding, GEMS validation and observing strategies

Operational Air Quality Forecasts, Regional and Global models of atmospheric composition

Air Quality Network, Research Sites, Research Vessels including in situ and remote sensing observations (lidar, Aeronet, Pandora)
Complimentary aircraft payloads and flight patterns

Large payload
- Trace gases
- Aerosol composition and properties
- Lidar: ozone, aerosol properties
- Actinic flux (photolysis)

Long range (8 hrs)
Profiling surface – 8 km

Small payload of remote sensors
- Geo-TASO (TEMPO simulator)
- MOS (ocean color)

Constant altitude (~8 km)

Small payload
- $O_3$, CO, SO$_2$, formaldehyde, VOCs, aerosols

Low altitude (0-4 km)
Repetitive sampling by the DC-8 over research sites in Seoul and adjacent rural areas
Repetitive sampling by the NASA King Air to map emissions over the Seoul Metropolitan Area and adjacent rural areas
Chemical forecasts

ISOP+MACR+MVK

NOx

NOx point sources

May 17

NOx mobile sources

May 19
Cooperative sampling of Power Plant and Seoul Emissions over the West Sea
KORUS-OC: An International Cooperative Ocean Color Field Study in Korea

• A joint study led by the Korea Institute of Ocean Science and Technology (KIOST) and NASA

• Field study (20 May – 6 June 2016) will focus on the links between satellite and ship-based measurements of ocean color, biology and biogeochemistry as well as atmospheric composition.

• Korea has a geostationary satellite for ocean color and aerosol optical depth (GOCI) and is building a second-generation sensor GOCI-II.

• Figure shows May 20 overflight of ship stations
Also find blogs, photos, videos, and more by searching “NASA Earth Expeditions KORUS-AQ”

Website

http://www-air.larc.nasa.gov/missions/korus-aq/index.html

Data Archive

https://espo.nasa.gov/home/korus-aq/content/KORUS-AQ