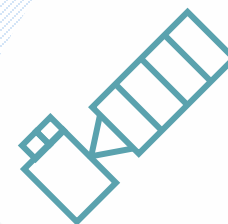


Current status and application plans of GEMS



Kyunghwa Lee

Environmental Satellite Center (ESC)

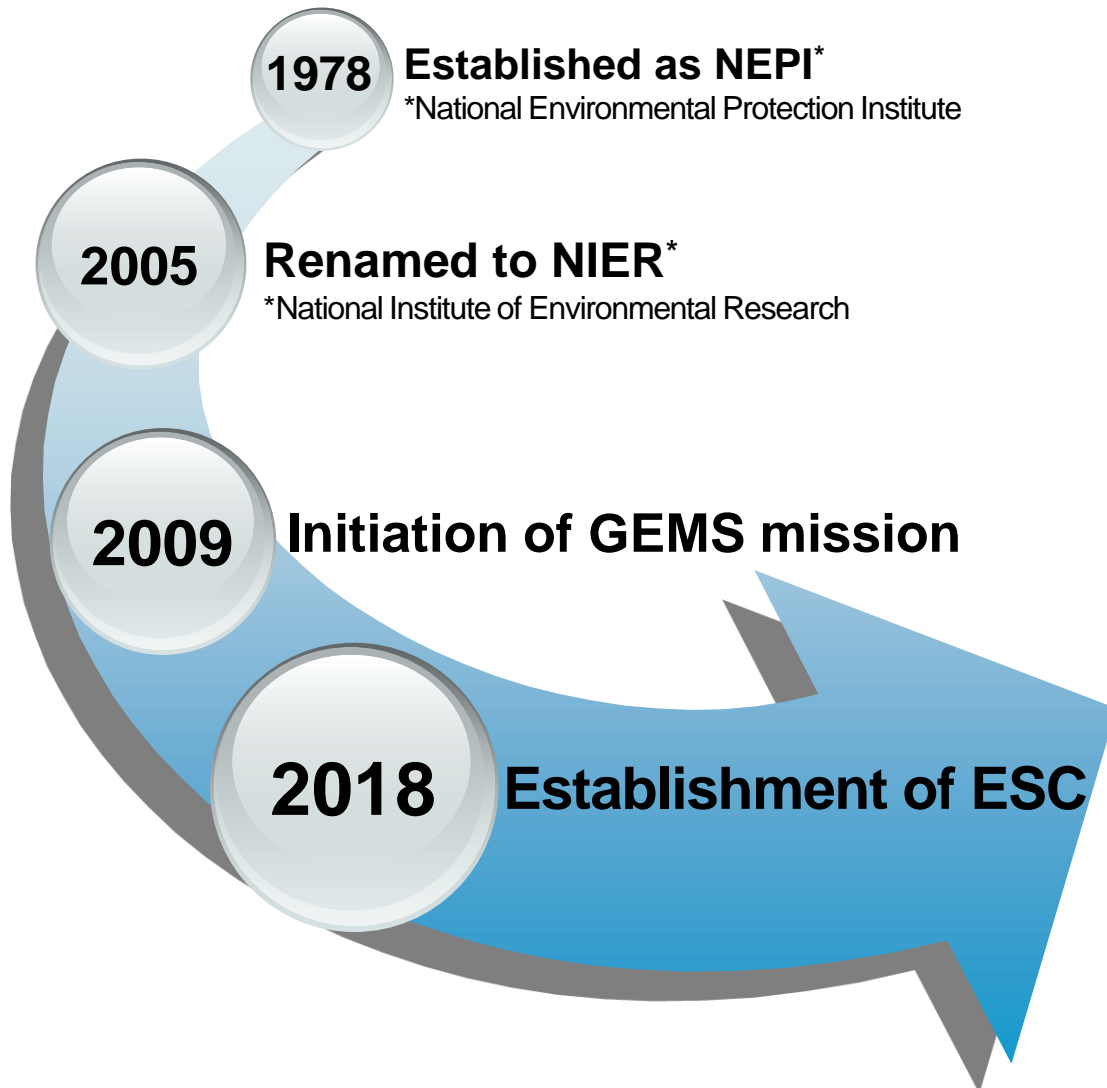
Climate and Air Quality Research Department

National Institute of Environmental Research (NIER)



Brief introduction of the ESC

A ground station of GEMS: Environmental Satellite Center (ESC)

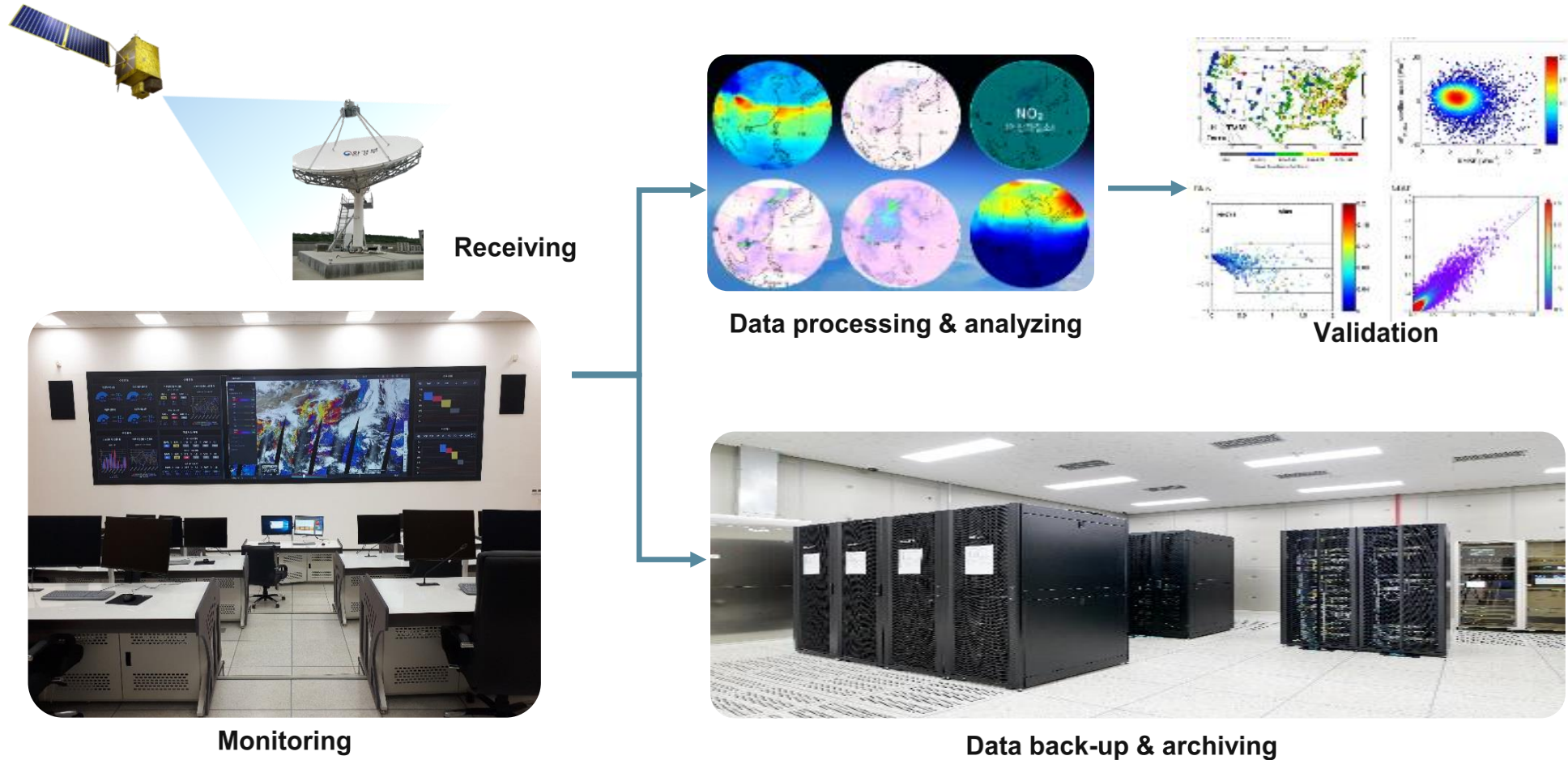


Launch of GEO-KOMPSAT-2B* (22:18 UTC 18 Feb. 2020)

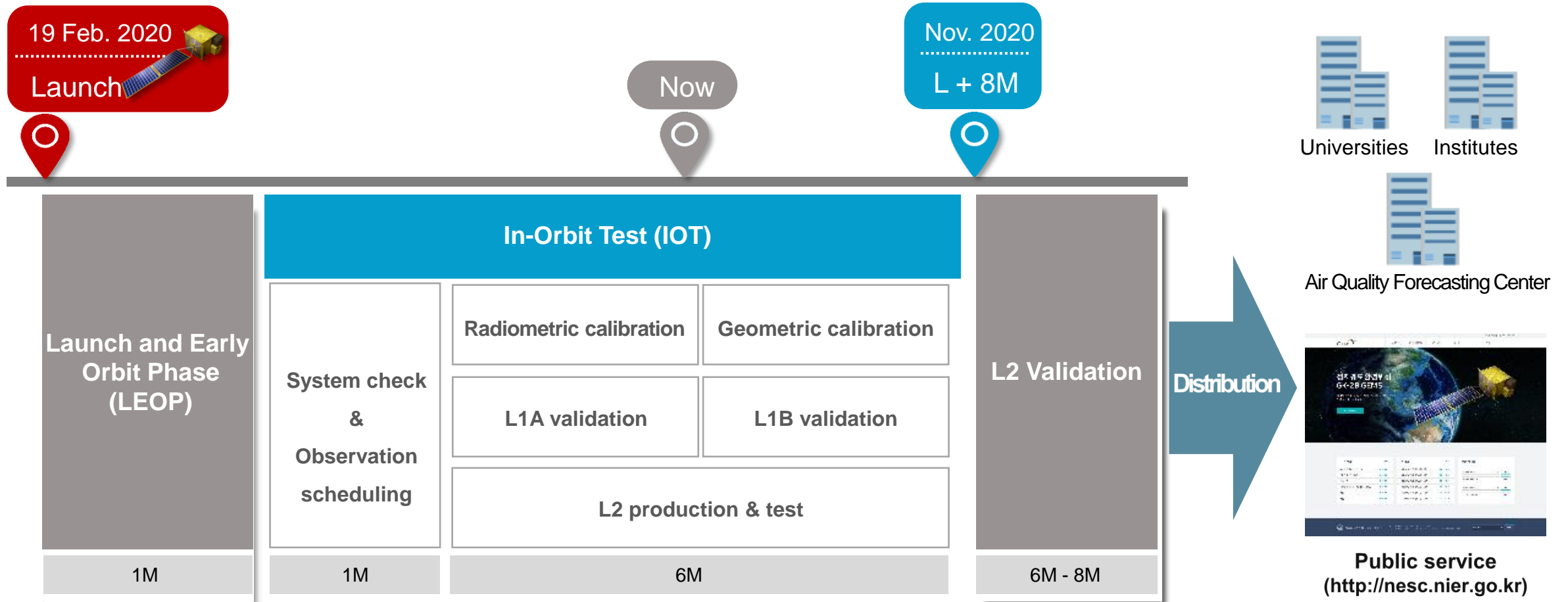


* Payloads of GEO-KOMPSAT-2B (GK-2B): GEMS (Geostationary Environment Monitoring Spectrometer)
GOCI-II (Geostationary Ocean Color Imager-II)

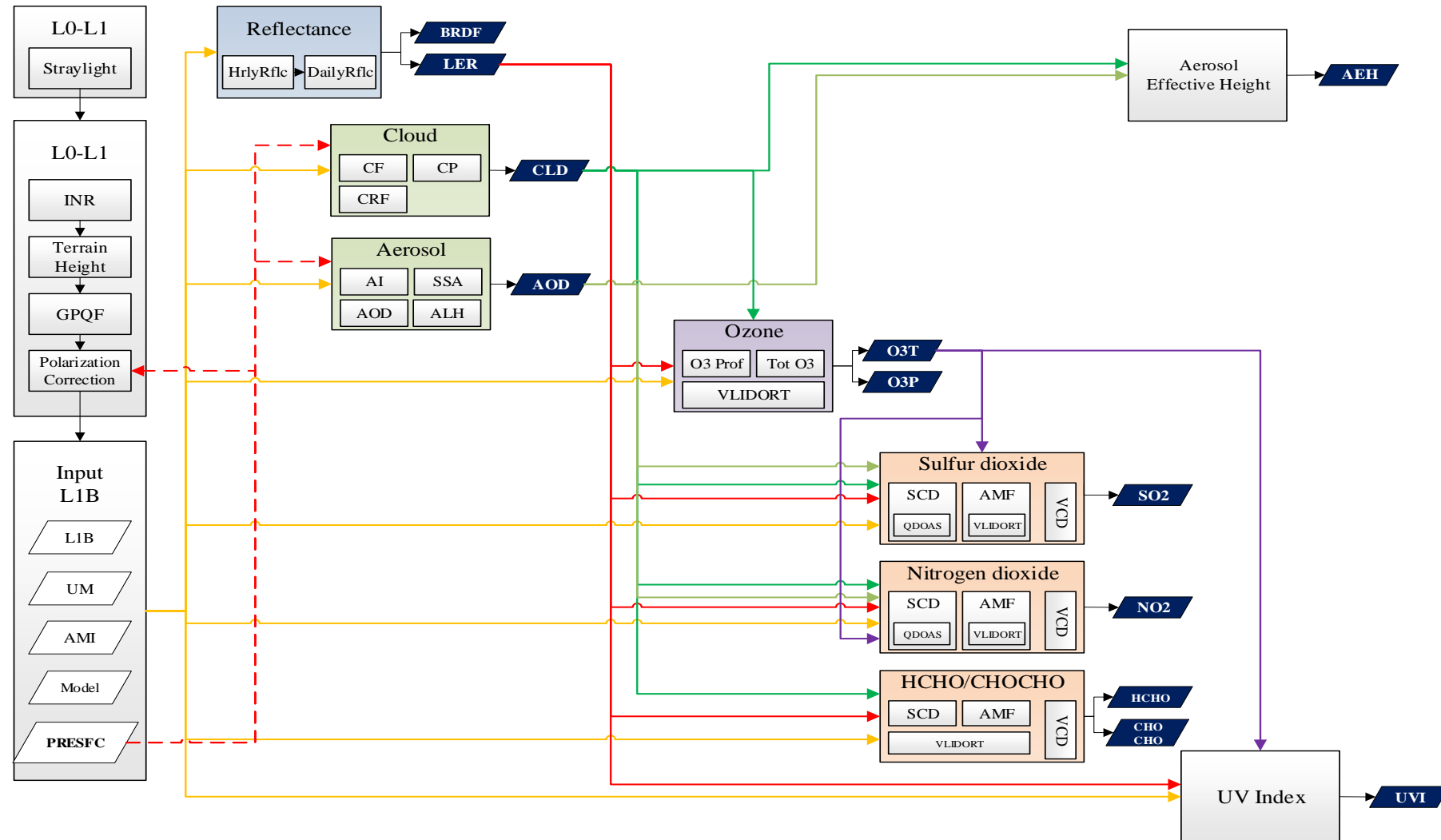
Roles of ESC for the GEMS operation



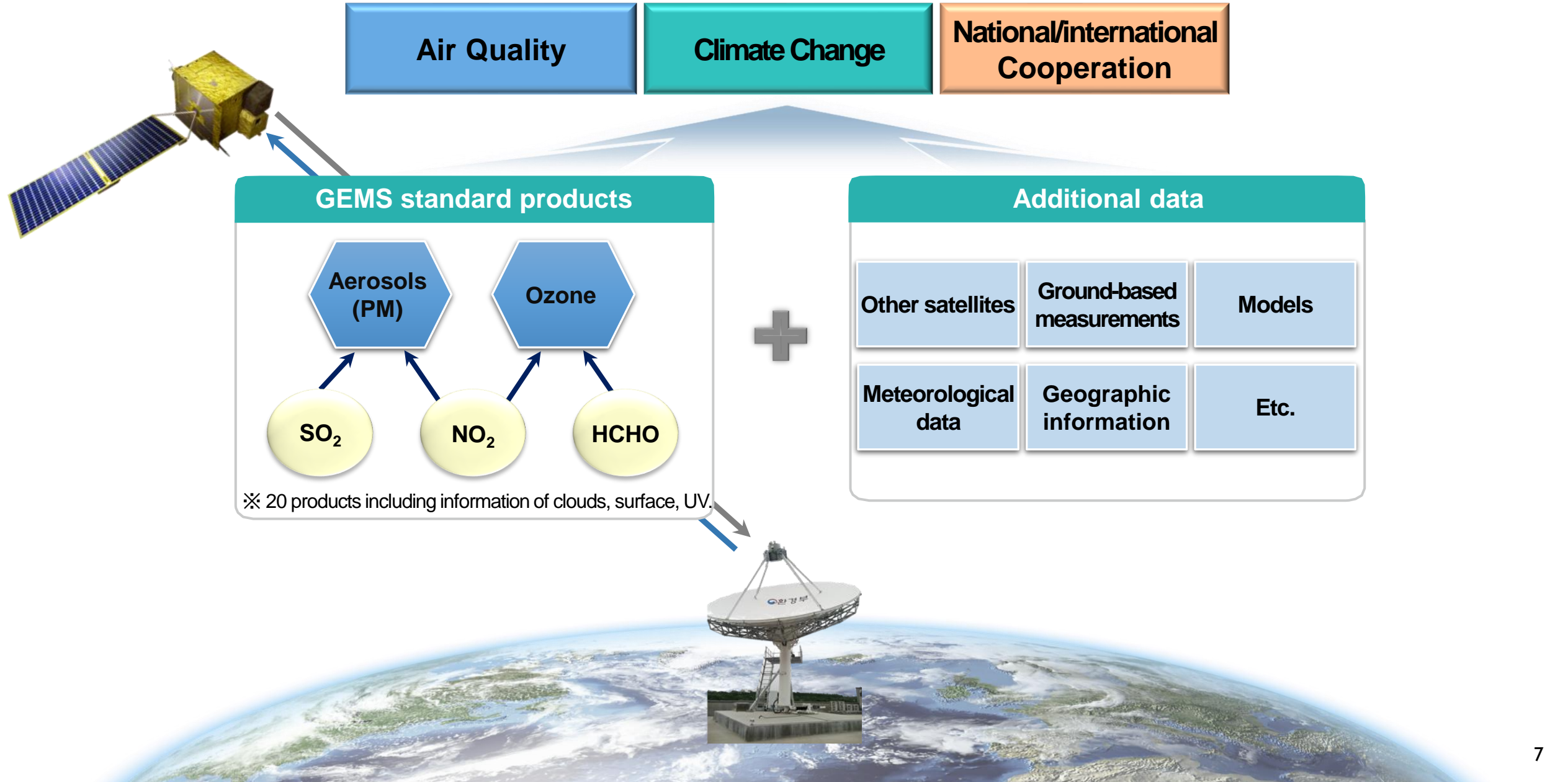
Time schedule for operation



L2 data production

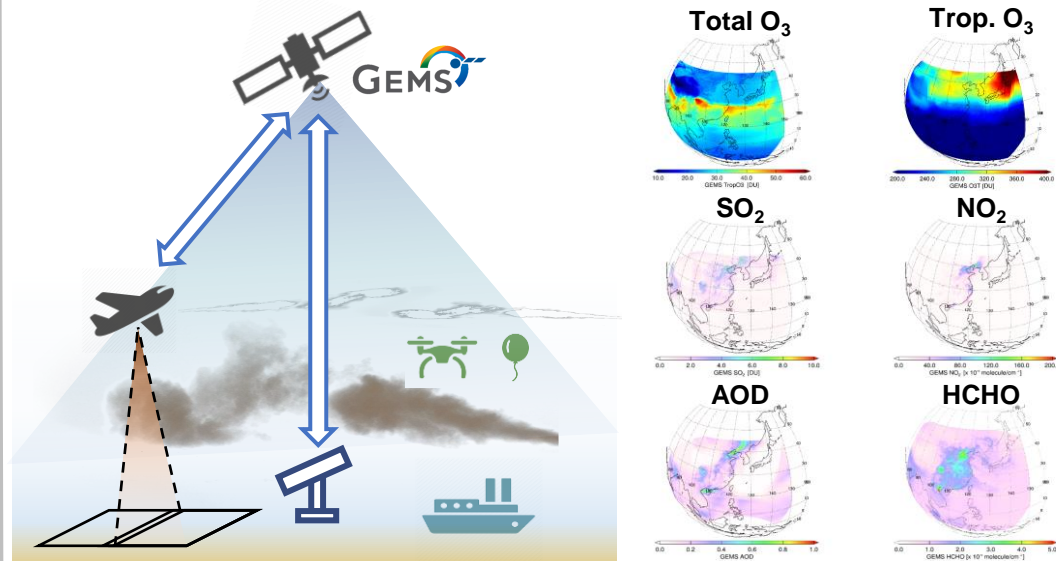


Application plans of GEMS

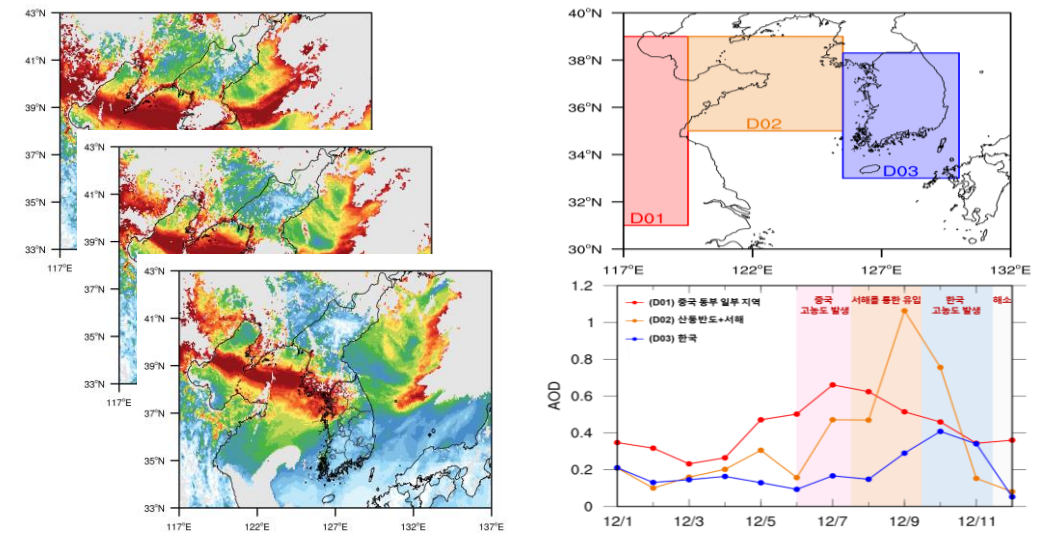


Improvement of the performance of air quality prediction models

Validation of satellite data using observations



Data analysis



Data provision

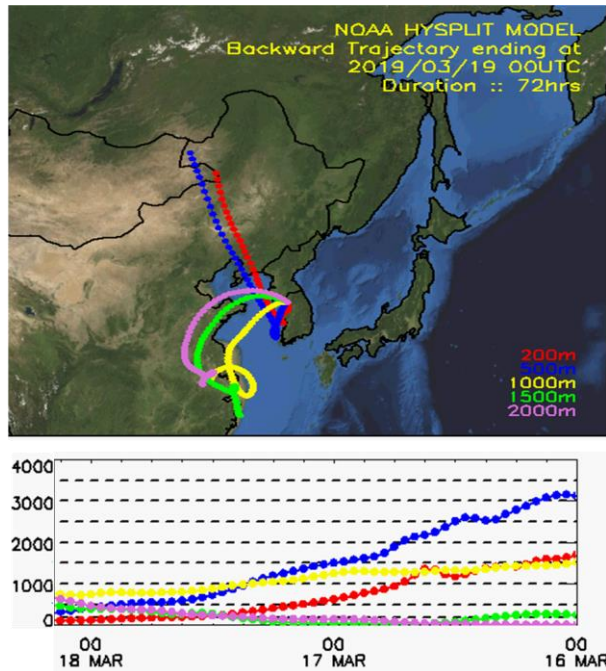


Environmental Satellite Center

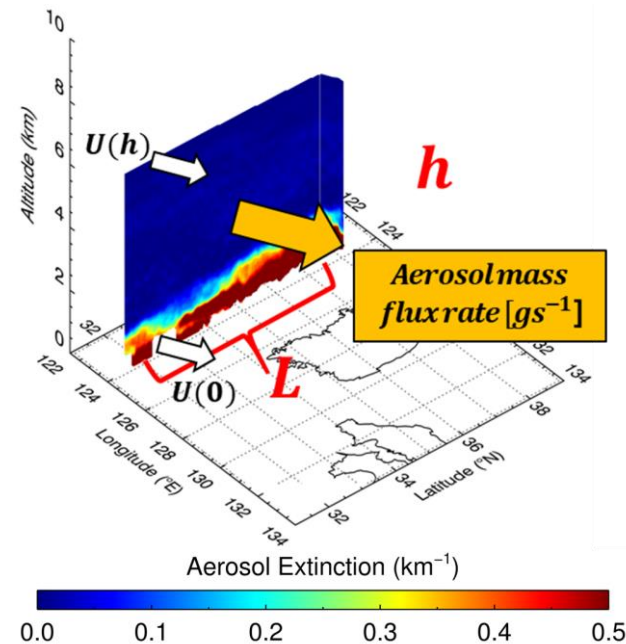
Air Quality Forecasting Center

Monitoring of long-range transported air pollutants

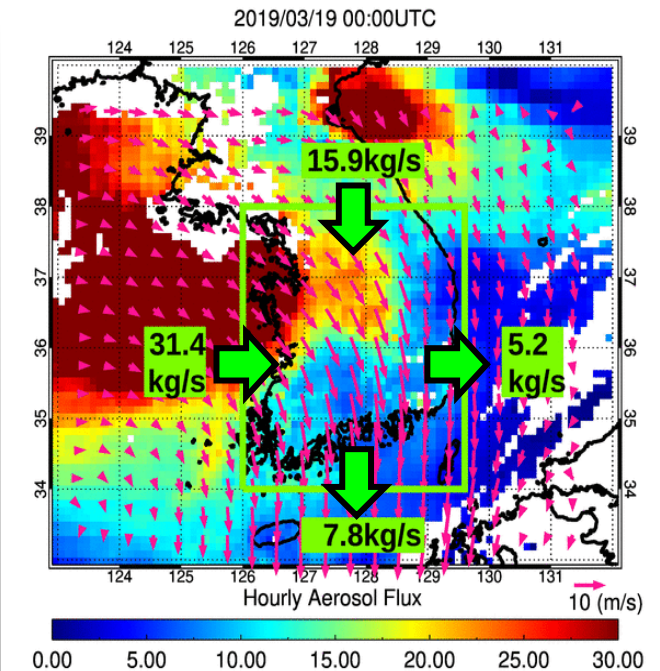
Detection



Calculation of mass flux rates

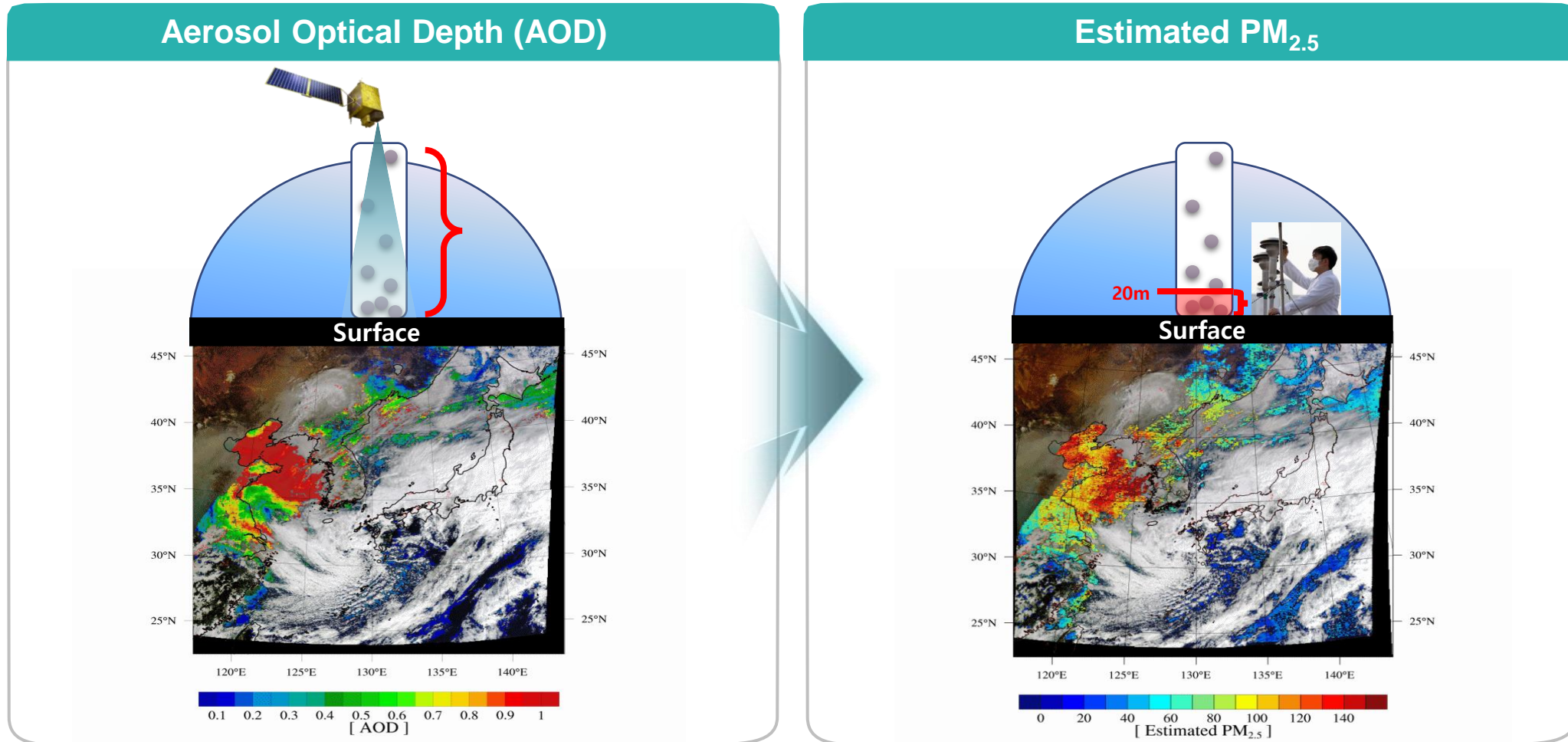


Visualization



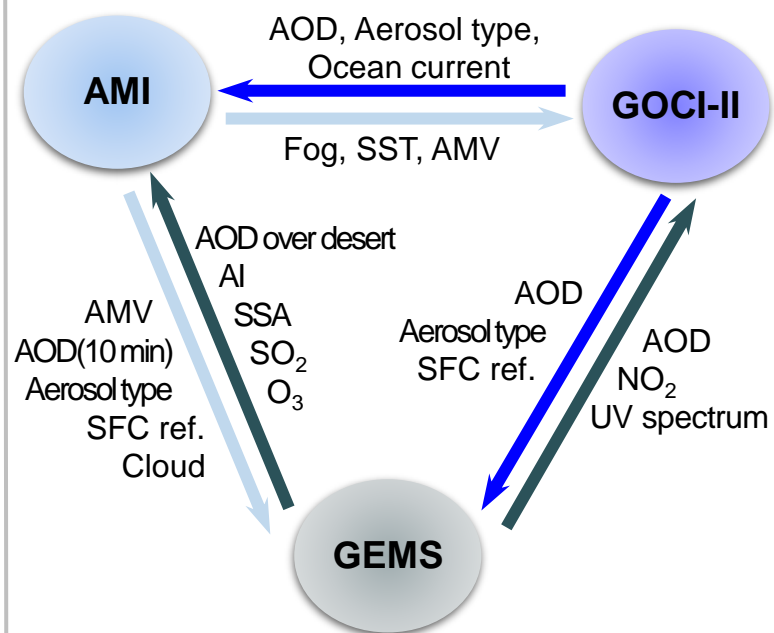
(Credit: Yonsei U. & NIER)

Estimation of ground-level particulate matter (PM) concentrations



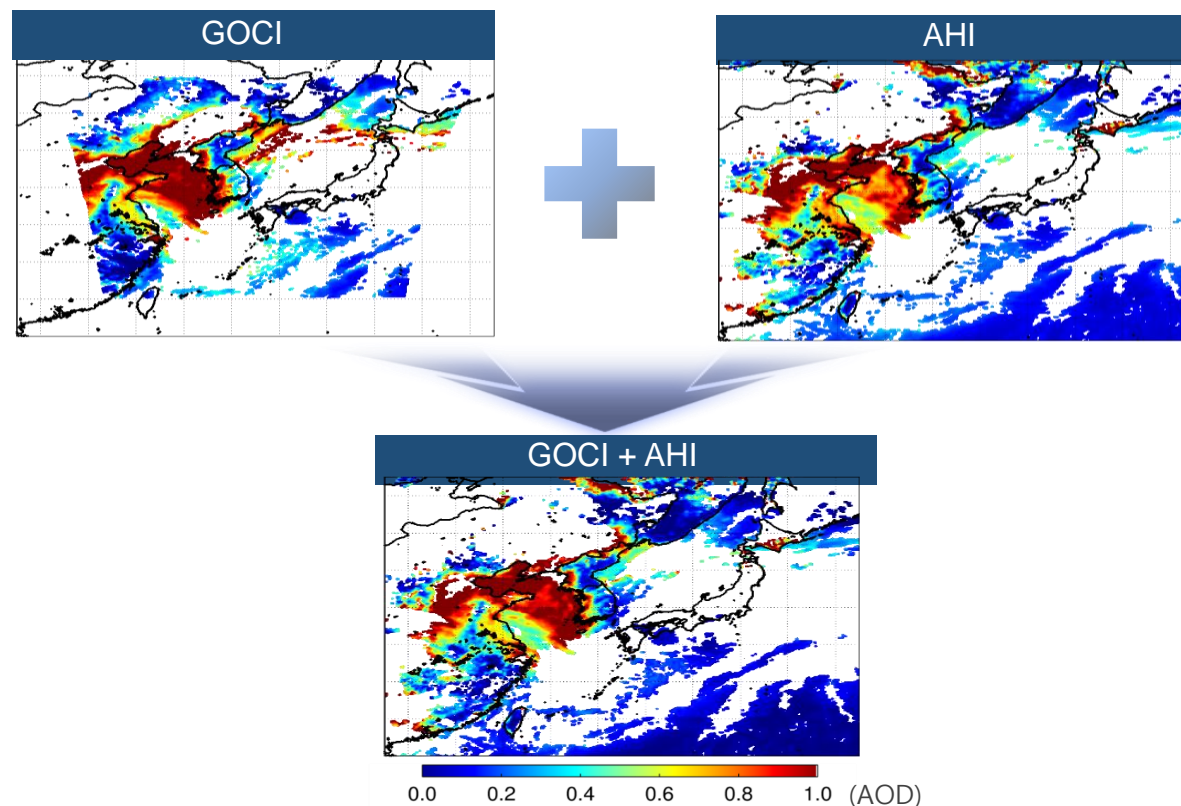
Data fusion

Synergy between various satellites



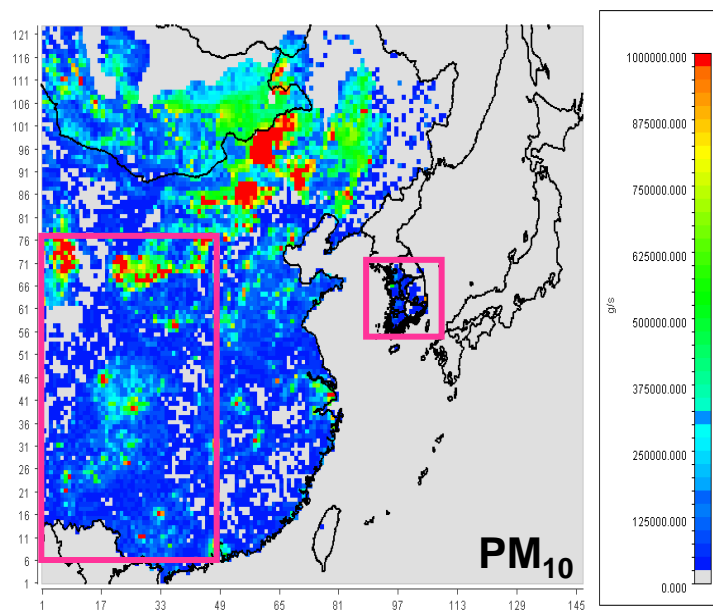
(Credit: Yonsei U)

e.g., AOD fusion

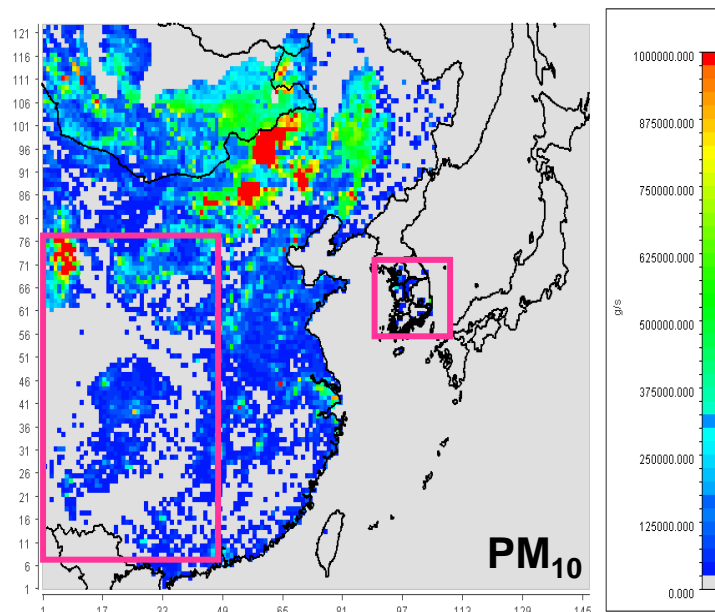


Estimation of top-down emissions

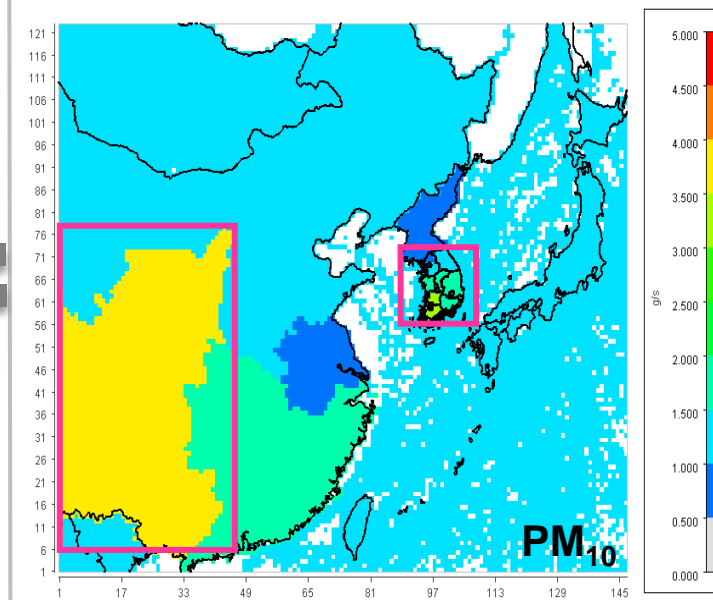
A posteriori emissions



A priori emissions



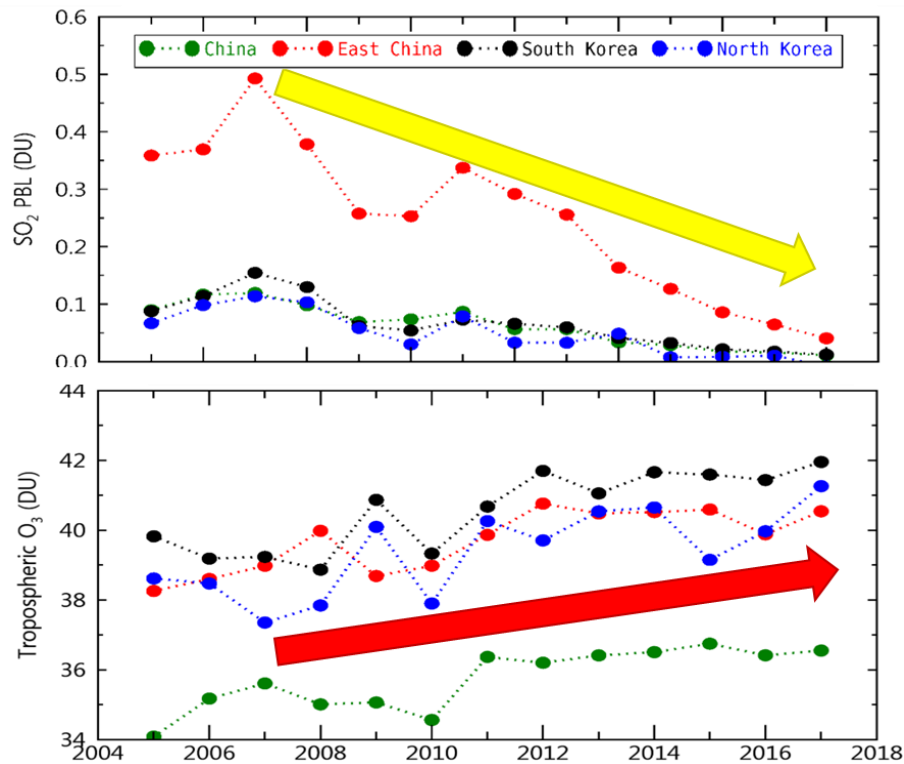
Differences



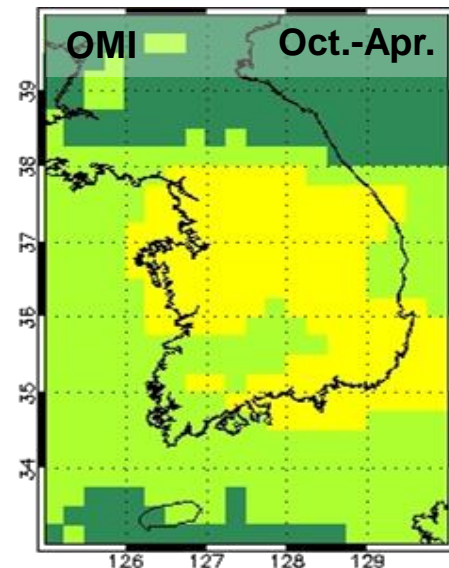
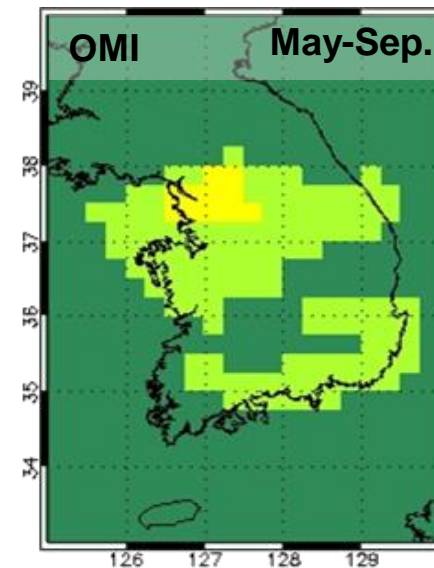
(Credit: Anyang U. & NIER)

Trend and ozone sensitivity analysis

Long-term trend analysis



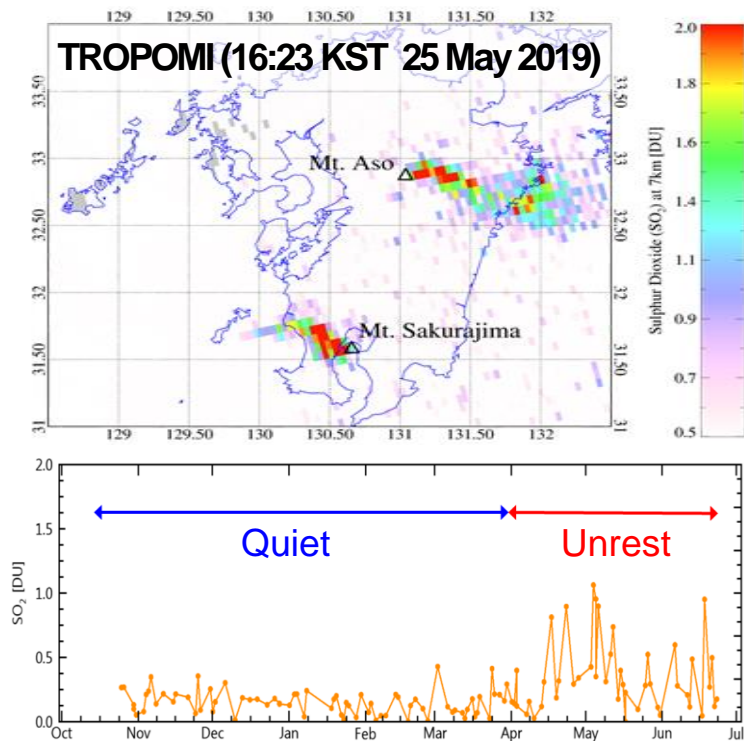
HCHO/NO₂ ratios (2005-2014)



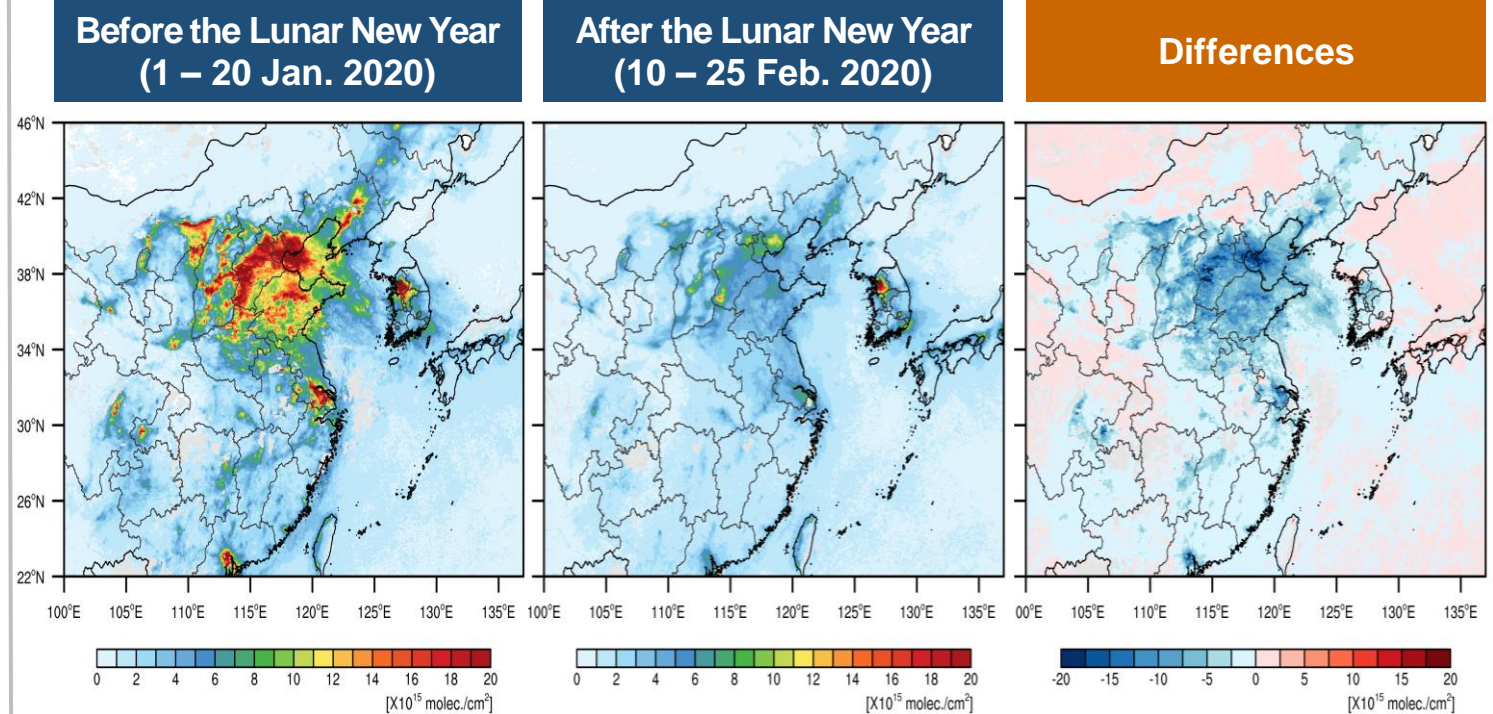
VOC-limited	(For O ₃ reduction) Reduction in VOC concentrations is effective
Transition	Reduction in both VOC and NO ₂ concentrations is effective
NO _x -limited	Reduction in NO ₂ concentrations is effective

Analysis of exceptional events

SO₂ emitted from volcanoes

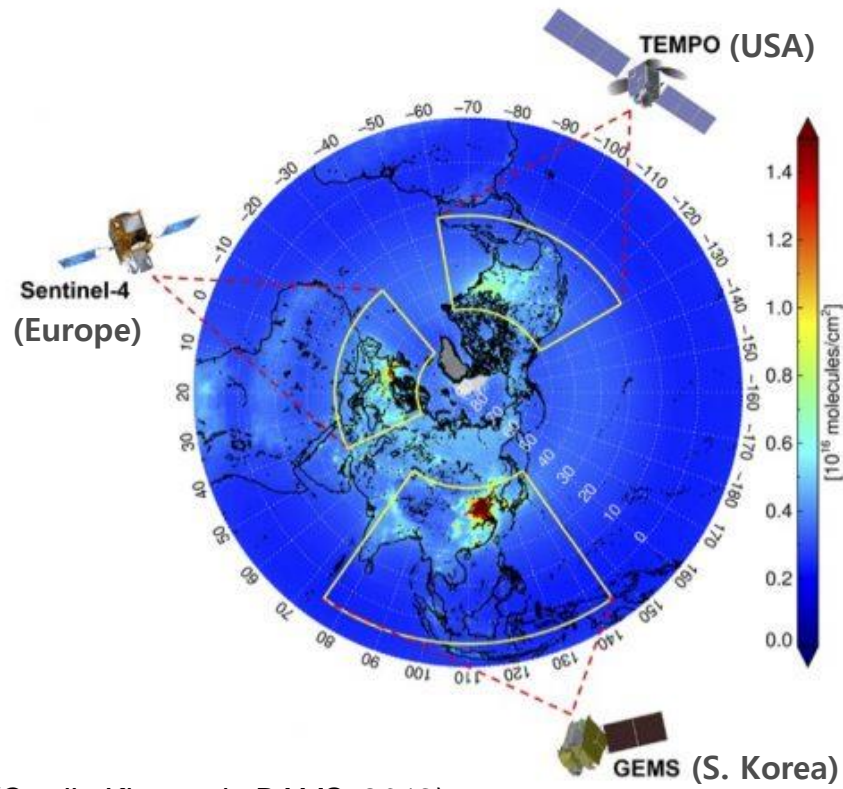


Variation of NO₂ concentrations due to the COVID-19



International joint research

Constellation of geostationary satellites



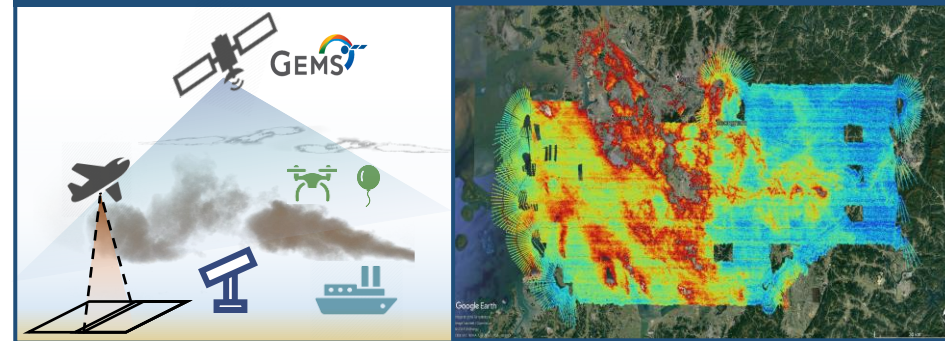
(Credit: Kim et al., BAMS, 2019)

International campaigns

Pandora Asia Network (PAN)



Satellite Integrated Joint monitoring of Air Quality (SIJAQ)



“

Thank you for your attention!

(Website of ESC: <http://nesc.nier.go.kr>)

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