



CASE STUDY

Geostationary Environment Monitoring Spectrometer (GEMS)

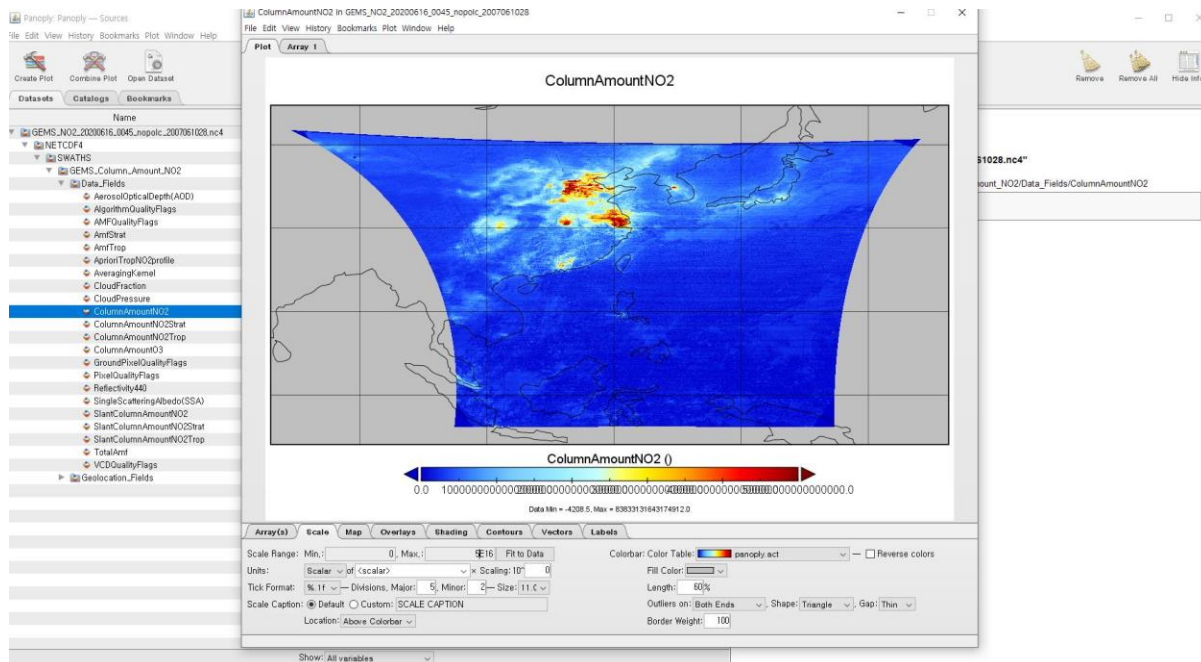
Republic of Korea

The Geostationary Environment Monitoring Spectrometer (GEMS), launched by the Republic of Korea in February 2020, enables the hourly monitoring of air pollution levels for almost 20 countries in Asia. Specifically, countries covered by the project include Cambodia, the Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam (ASEAN); Bangladesh, Bhutan, Nepal and Sri Lanka in South Asia; and China, Japan and the Republic of Korea in North-East Asia. The satellite also covers parts of India, Indonesia, Kazakhstan, Kyrgyzstan, Mongolia, Papua New Guinea, the Russian Federation and Tajikistan.

GEMS is the first satellite to launch in an integrated three satellite constellation, in order to revolutionize the way scientists observe air quality over significant swaths of the Northern Hemisphere. While GEMS will monitor atmospheric gases over Asia, TEMPO will monitor North America, and Sentinel-4 will observe the air quality over Europe. This marks a significant leap forward in the ability of scientists to monitor air pollution from space. The regular measurement of O₃ and its precursors NO_x and volatile organic compounds, along with particulate matter, SO₂ and other pollutants, will improve the accuracy of air quality forecasts, top-down emission rates and understanding on the long-range transport of air pollutants.



Figure 1. Example of GEMS Data Display



Disclaimer: The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

Additional details and more practices like this can be found in [Geospatial Practices for Sustainable Development in Asia and the Pacific 2020: A Compendium](#)