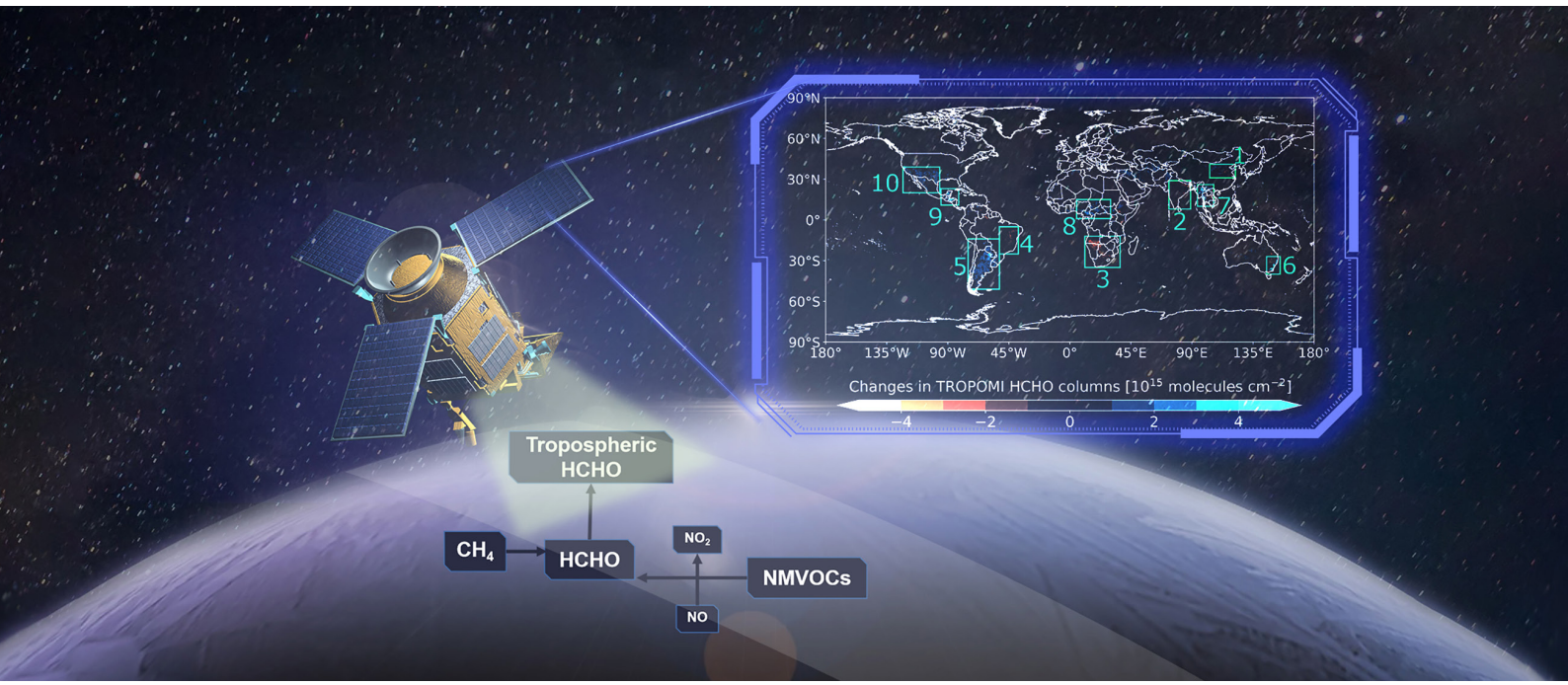

ADVANCES IN FORECASTING AIR POLLUTION

An international effort is working towards accurate monitoring and forecasting of POLLUTION AND GREENHOUSE GAS emission.

Yan QIU and Wenfu SUN (SUSTech)

In the first four months of 2020, a significant decrease in atmospheric formaldehyde, a proxy for a group of pollutants known as non-methane volatile organic compounds (NMVOCs), was observed above the Northern China Plain.

The measurements, taken from a European Space Agency satellite by the TROPOspheric Monitoring Instrument and reported in *Geophysical Research Letters*, suggest there has been a 15% decrease in NMVOC emissions linked to human activity in the Northern China Plain compared to the same period in 2019.

NMVOC emissions are important precursors to the greenhouse gas, ozone, explains corresponding author, Lei Zhu, an assistant professor in the Atmospheric Chemistry Modeling & Remote Sensing Group at the Southern University of Science and Technology (SUSTech).

Zhu and his team have been working with collaborators at NASA and Harvard University in the United States, among others, to improve the models used to forecast air pollution.

In 2020, they compared research aircraft formaldehyde measurements with satellite data from above the United States, eastern Asia and the Pacific Ocean. Data on inconsistencies between different satellite instruments at different times of year are being fed into an SUSTech platform designed help optimize satellite data retrieval.

But, it is still not sufficient to distinguish pollution levels between different city districts. "The finest satellite resolution is now roughly 3-5 kilometres, which is not quite enough," says Zhu. His team is therefore designing algorithms that help correlate satellite data with local measurements to give better district-level information.

Their ultimate aim is to forecast particulate matter and ozone concentrations throughout the region, by the hour, from a planned facility near Shenzhen, says Zhu. "We know that in northern parts of China, the air pollution is mainly caused by particulate matter, while in Shenzhen in southern China it is caused by surface ozone," says Zhu. "With our simulations, we hope to better understand where both these air pollutants come from, and give advice to local governments on reducing emissions by area and amount."

In a broader sense, the SUSTech team hopes to contribute to reductions in global warming by also tracking important greenhouse gasses such as carbon dioxide, methane, and chlorofluorocarbons. "In the past five years, China has had huge successes with particulate matter, which has decreased by 30% to 40%. We hope to inspire government stakeholders and populations to tackle greenhouse gases with similar enthusiasm." ■

SUSTech Southern University of Science and Technology
Email: zhul3@sustech.edu.cn
Email: global@sustech.edu.cn
Website: www.sustech.edu.cn
Website: www.acmrsg.org