

# NIES – ARIES Scientific Collaborations on Air Quality and Climate Change



*- For better scientific understanding and contributing to the sustainable world -*



आर्यभट्ट प्रेक्षण विज्ञान शोध संस्थान  
ARYABHATTA RESEARCH INSTITUTE OF OBSERVATIONAL SCIENCES  
(AN AUTONOMOUS INSTITUTE UNDER DST, GOVT. OF INDIA)

*Dr. Hiroshi Tanimoto*  
*Research Director*  
*Earth System Division*

*Dr. Manish Naja*  
*Chairman*  
*Atmospheric Science Division*

# Why Air Quality and Climate Change?

- Impacts of air pollution on human health
- Impacts of air quality on climate change



**Billions of people still breathe unhealthy air: new WHO data**



**Heavy rains and flooding hit large parts of Asia**

*We, atmospheric chemists, are willing to contribute to better understanding of the scientific basis and to solving the problems*



National  
Institute for  
Environmental  
Studies, Japan

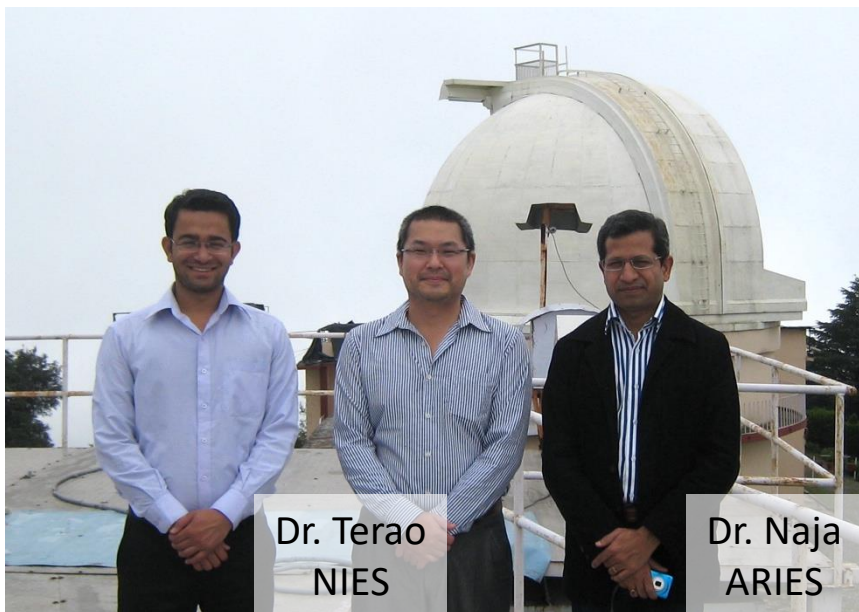


आर्यभट्ट प्रेक्षण विज्ञान संशोधन संस्थान  
Aryabhata Research Institute of Observational Sciences

MEMORANDUM OF UNDERSTANDING  
BETWEEN  
NATIONAL INSTITUTE FOR ENVIRONMENTAL STUDIES  
JAPAN  
AND  
ARYABHATTA RESEARCH INSTITUTE OF OBSERVATIONAL SCIENCES  
INDIA  
FOR JOINT RESEARCH ON  
**Air Quality and Climate Change**

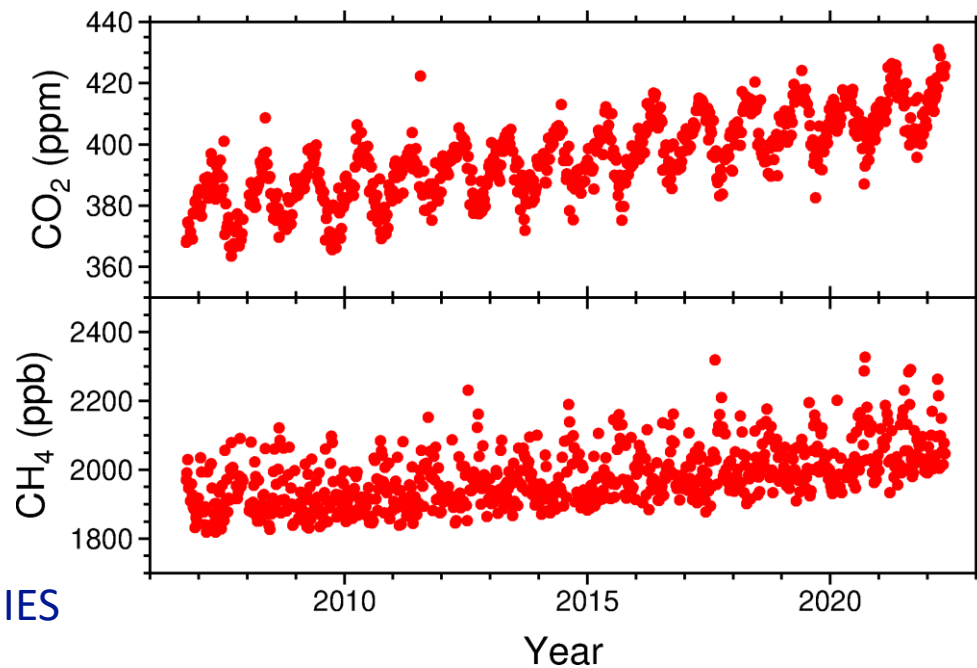
*Effective on 2022.4.1*

# Nainital: The longest GHG record in South Asia since 2006



*Dr. Yukio Terao*

Data is available at NIES/CGER Global Environmental Database



- Weekly air sampling by ARIES
- Flask transportation between ARIES and NIES
- High precision GHG analysis by NIES

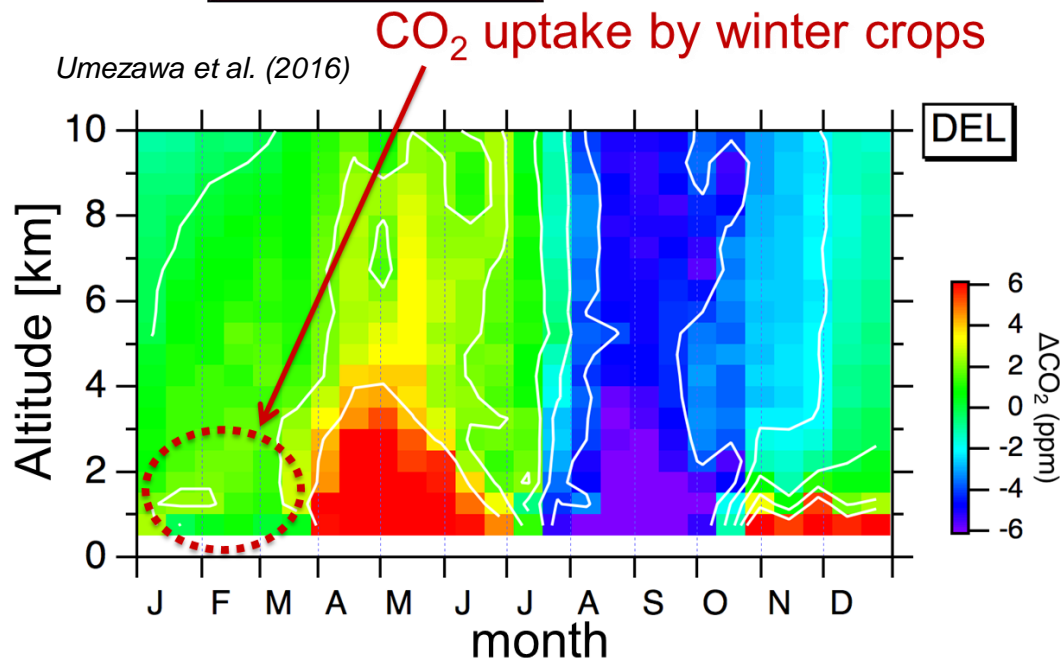
# GHG observations by a commercial airliner - CONTRAIL



Dr. Toshinobu Machida

CME: Continuous CO<sub>2</sub> Measuring Equipment

ASE: Automatic Air Sampling Equipment



- Seasonal variations of vertical CO<sub>2</sub> profiles over Delhi
- Substantial CO<sub>2</sub> uptake by agricultural activities



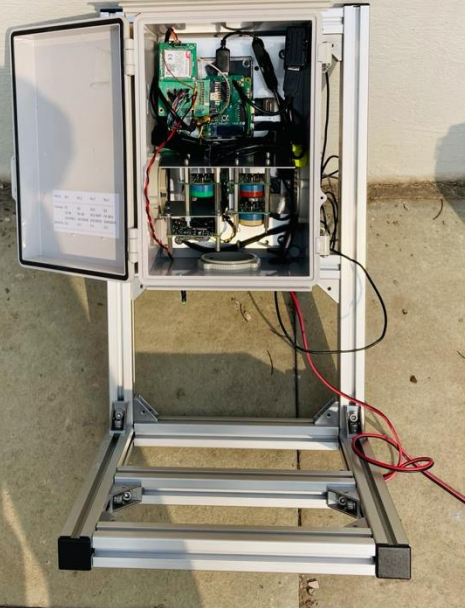
CONTRAIL NIES



# PM2.5 observations at the Embassy of Japan in Delhi



在インド日本国大使館  
Embassy of Japan in India



- PM2.5
- O<sub>3</sub>
- CO
- NO<sub>2</sub>
- CO<sub>2</sub>



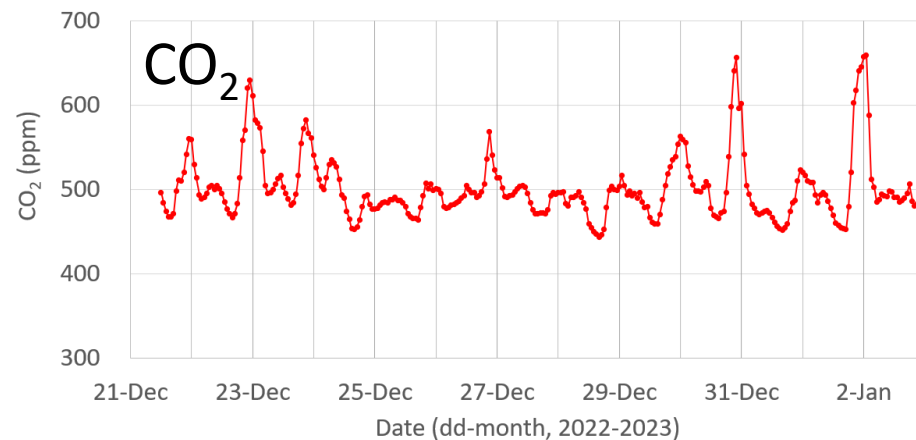
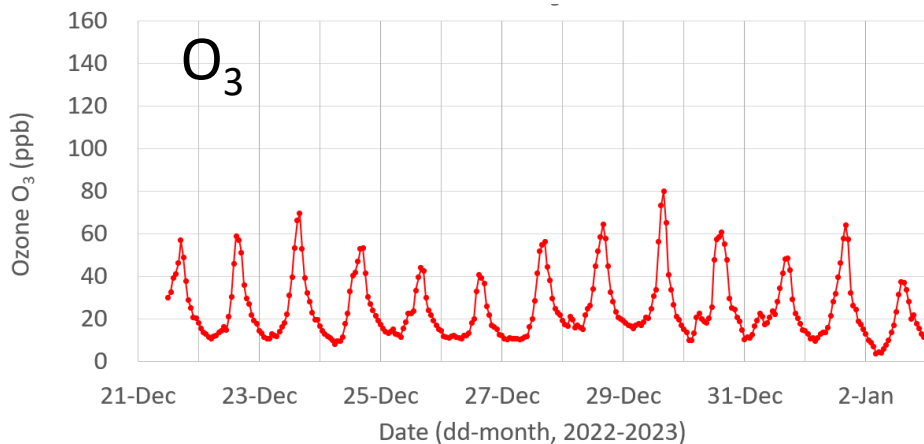
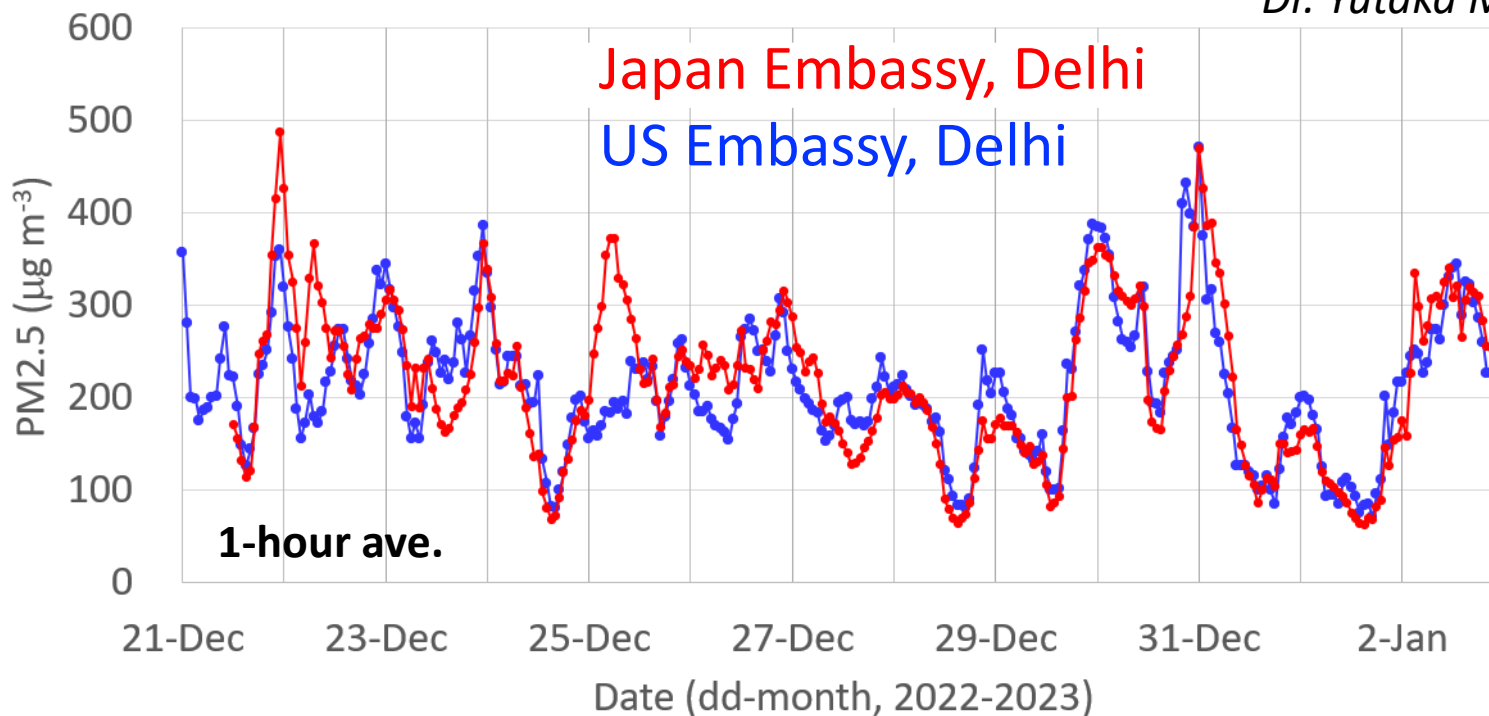
Sensors



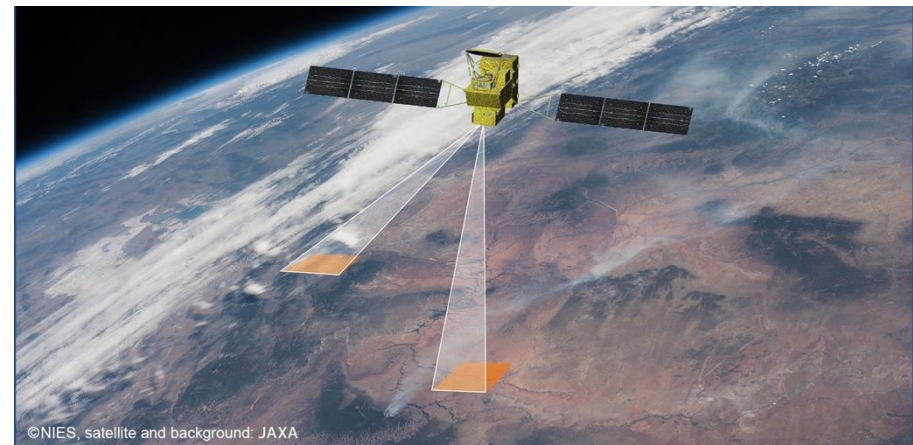
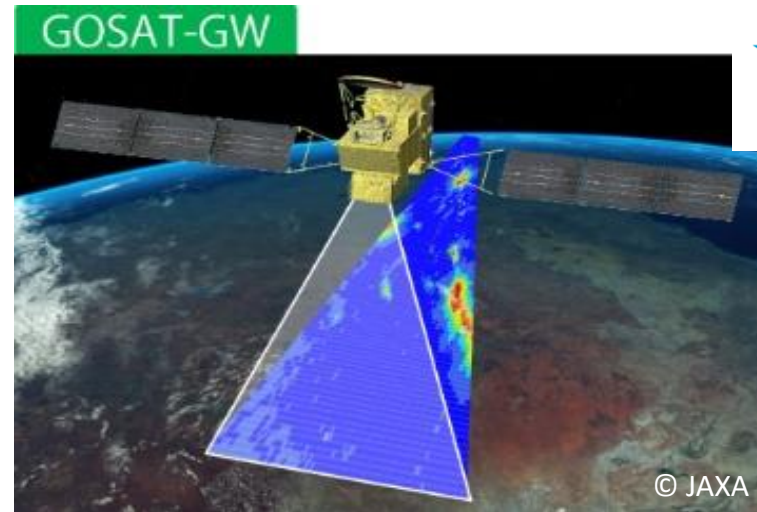
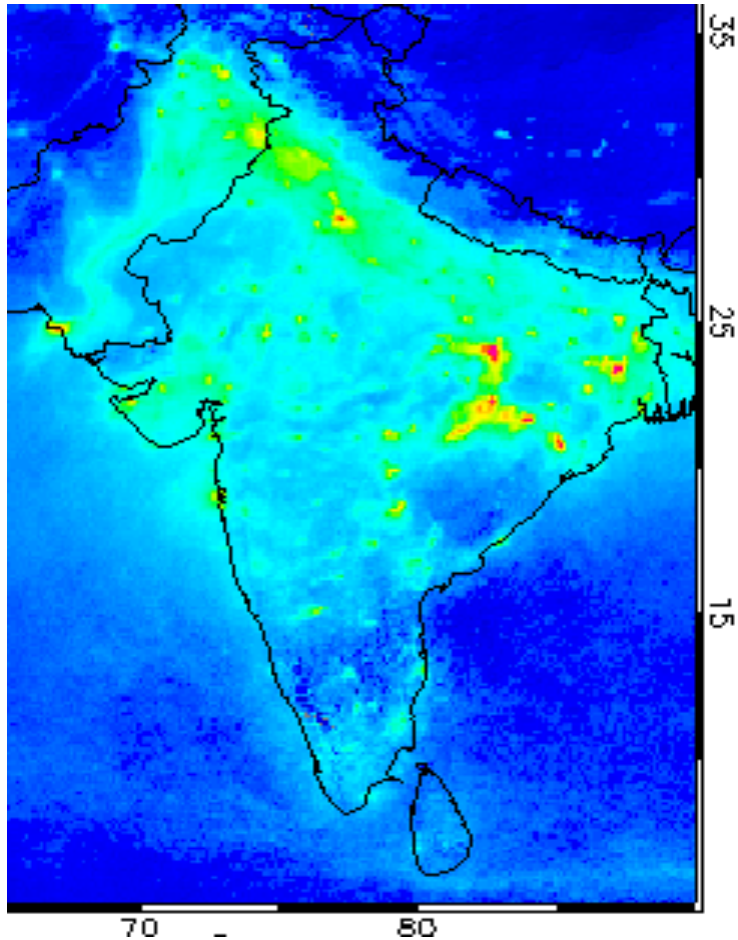
Solar Panel

# PM2.5 and other air pollutants in Dec. 2022

*Dr. Yutaka Matsumi*



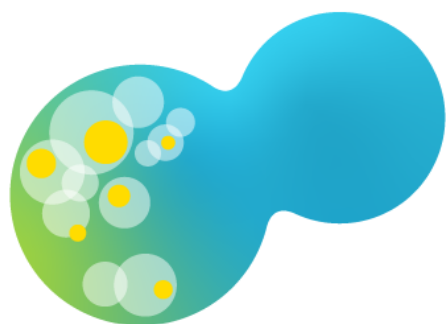
# GOSAT-GW satellite detects emissions



- GOSAT-GW is the joint project by MOEJ and NIES, and will be launched in 2024
- GOSAT-GW is the world first satellite to observe CO<sub>2</sub> and NO<sub>2</sub> at a city-scale
- Contributions to national and international policies on climate change and air quality







# Climate Change & Air Quality

Research Program

<https://esd.nies.go.jp/ja/climate-change-air-quality/>