

International Meeting on Land Cover/Land Use Change (LCLUC) in South/Southeast Asia and Synthesis

JAN/FEB 2024



ESCAP

Economic and Social Commission
for Asia and the Pacific



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Space Applications Section

ICT and Disaster Risk Reduction Division

WHO - Project Partners



- Engagement participating member States and expert network



- Funding Sponsor
- Pandora Instrument installation



- Technical operator of GEMS satellite and PAN network
- Air pollution operational data products

WHO – Participating Primary Partners

Participating member States



Bangladesh
SPARRSO



Cambodia
MoE



Indonesia
BRIN



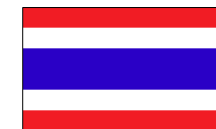
Lao PDR
MoNRE



Mongolia
IRIMHE



Philippines
PhilSA



Thailand
GISTDA



Viet Nam
MONRE

Subject Area	#	Member States
Space	4	BG, IN, PH, TH
Environment	4	KH, LA, MN, VT

Project coverage in the Asia Pacific region

- COUNTRIES: 17% no. of countries (World Bank, 2020)
- SPATIAL: 13.8% of land area (World Bank, 2020)

WHO – Participating Secondary Partners



Research Institutions/ Academia

Thematic knowledge products

- Atmospheric modeling
- Surface level concentration
- Satellite data validation
- Source apportionment
- Etc.



Engaging Chiang Mai Rajabhat University in Chiang Mai, Thailand in AUG 2022



Governance

Evidence based policy making

- Pollution control departments
- Monitoring stations
- City and/or municipal governments



Engaging the Pollution Control Department in Bangkok, Thailand in AUG 2022

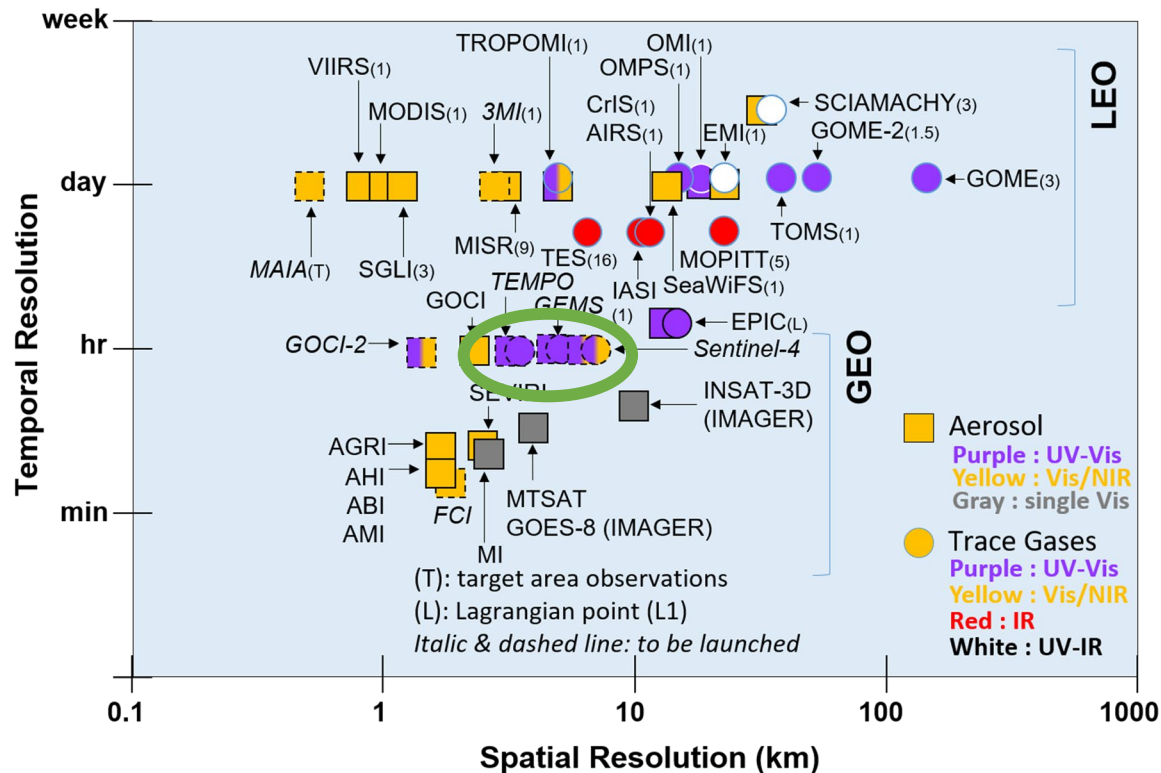


Engaging the Chiang Mai Municipality Office in Chiang Mai, Thailand in AUG 2022

WHAT – Inputs for air quality final product

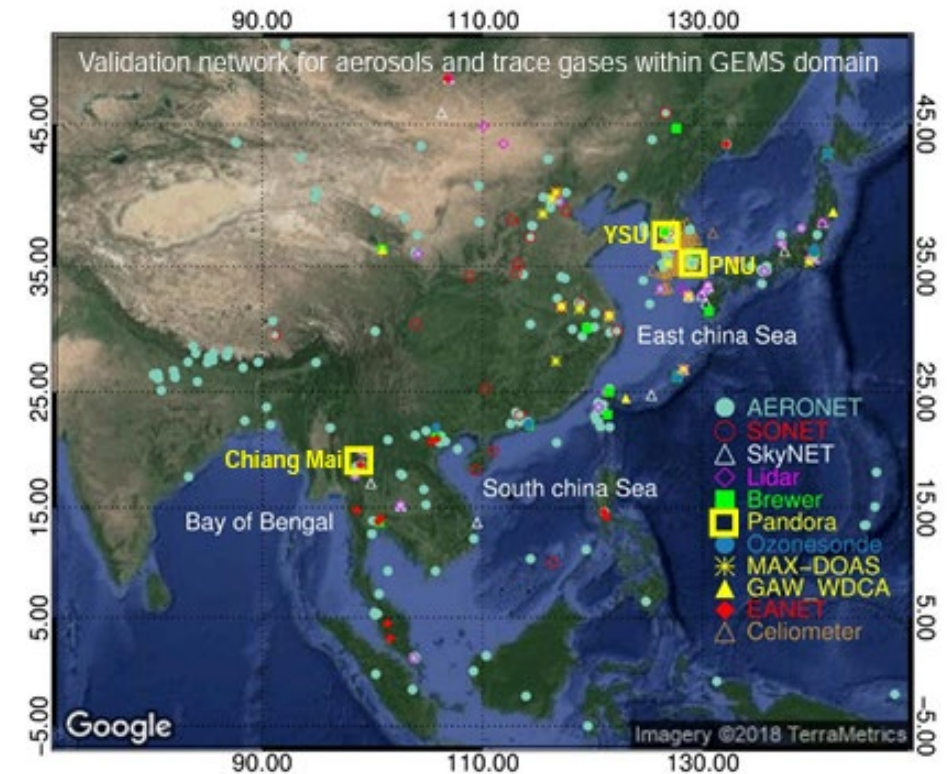
Remotely sensed observation sources:

Satellite Data



Source: Kim et al. (2020)

Ground-based Data



Courtesy of NIER

WHERE – Future

Pandora Asia Network



	Site	Site Survey	Delivery	Installation Training	Installation	Initial Setup	Data Transfer	Completed
Bangladesh	TBD (2 sites)							
Cambodia	Phnom Penh	✓	✓	✓	✓	✓	✓	✓
Indonesia	Bandung	✓	✓	✓	✓	✓	✓	✓
	Agam	✓	✓	✓	✓	✓	✓	✓
	Pontianak	✓	✓	✓	✓	✓	✓	✓
Laos	Vientiane	✓	✓	✓	✓	✓	✓	✓
Mongolia	Ulaanbaatar	✓	✓	✓	✓	✓	✓	✓
	Dalanzadgad	✓	✓	✓	✓	✓	✓	✓
Philippines	TBD (4 sites)							
Thailand	Bangkok	✓	✓	✓	✓	✓	✓	✓
	Chiang Mai	✓	✓	✓	✓	✓	✓	✓
	Song Khla	✓	✓	✓	✓	✓	✓	✓
Vietnam	TBD (3 sites)							

As of Jan 2024

- 30 Pandora installation sites in Asia Pacific region
- 10 or 33 percent of Pandoras are installed by this project
- 9 additional Pandoras in 3 countries is planned by the end of this project

HOW – Capacity Building

“Capacity” in PAPGAPI:

**Network/
Focal
points**

- Local Pandora operators
- Local investigator/experts

Software

- Data retrieval algorithm (L2)
- Data applications (L3, L4)

**Hardware/
Infrastructure**

- Pandora network
- GEMS

Example Outcomes:

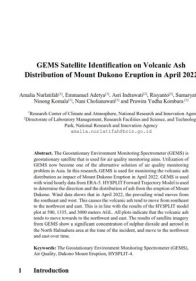
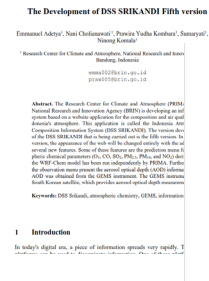
Knowledge Transfer



Courtesy of GISTDA and PhilSA

Locally organised capacity building meetings

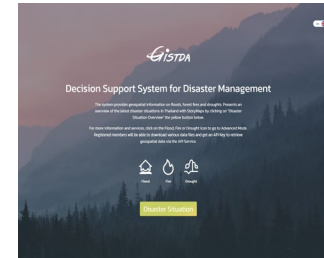
Research Output



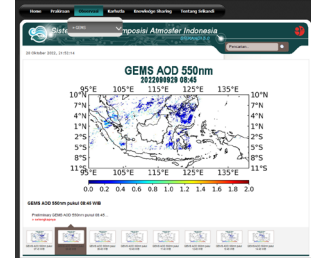
Courtesy of BRIN

Academic papers

DSS Development/Data Integration



Courtesy of GISTDA



Courtesy of BRIN

DSS Tools

WHAT – Technical Mission in May 2023

Date: 22-25 May 2023

Participants: 6

About: Prepare for the in-person capacity building and on-the-job training with experts.

Experts on topics:

- Surface level concentration estimation using linear and non-linear methods
- GEMS data validation and correction with Pandora
- Differential Optical Absorption Spectroscopy
- Atmospheric modeling and transboundary effects



WHAT – Online Training in June 2023

Date: 19-30 June 2023

Participants: 102

About: Introductory training on using remote sensing data for air pollution management and monitoring.

Topics covered:

- Basic concept of satellite data: from L0 to L4
- Utilizing satellite data: how to read and visualize
- Processing satellite data: regridding
- Space-borne instrument: LEO and GEO
- Ground-based observation: remote-sensing and in-situ
- Intercomparison of data from satellite and ground-based observations: collocation



WHAT – In-person Training in January 2024

Date: 8-19 January 2024

Participants: 25

About: In-depth and targeted training on select topics on applications of remote sensing data for air pollution monitoring and management



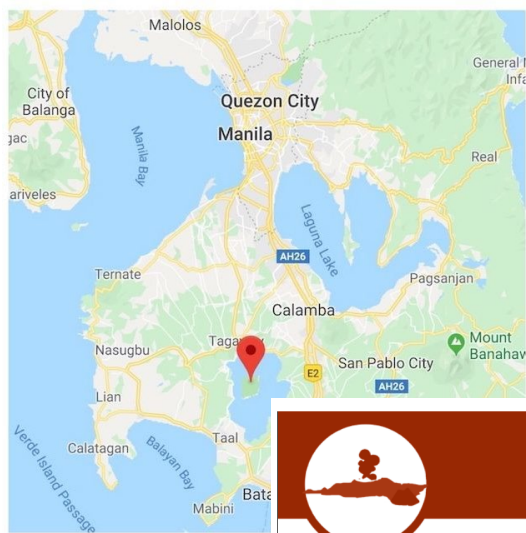
Topics covered:

- DOAS observations using Pandora
- GEMS data validation and correction with Pandora data
- Surface level concentration estimation for PM2.5
- Studying transboundary effects of air pollution

WHAT – Use Case

Presented in 2nd Plenary Meeting of Pandora Asia Network, NOV 2023:

Taal volcanic activity on 21 SEP 2023



Source: PHIVOLCS

Source: Google maps

News outlets reporting impacts of Taal:

Manila Bulletin

NATIONAL NEWS

Metro Manila smog 'not related' to Taal Volcano's activity

BY ELLALYN DE VERA-RUIZ

Sep 22, 2023 11:03 AM



Manila Times

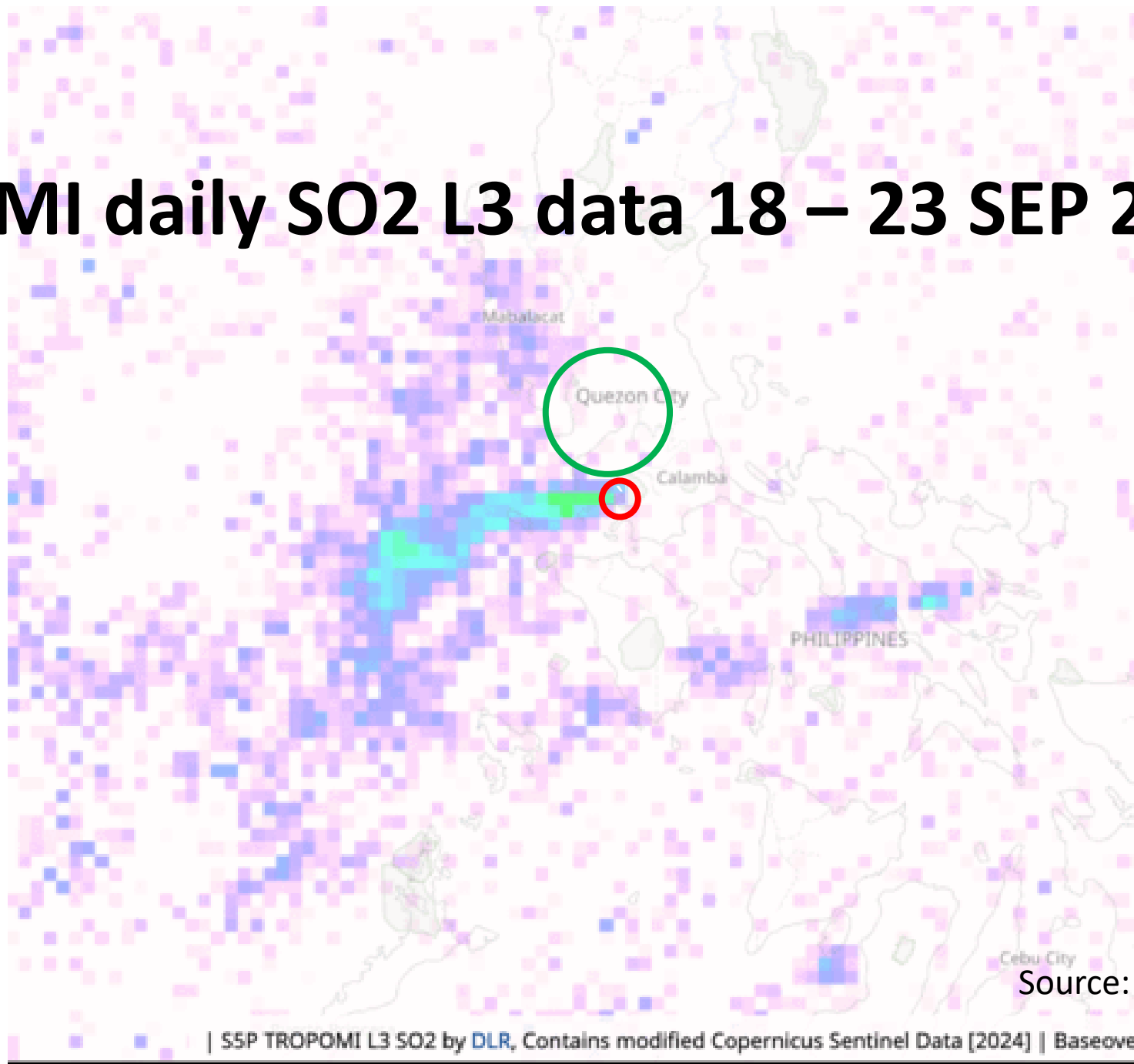
Videos

Smog from Taal volcano blankets Metro Manila

September 23, 2023 250



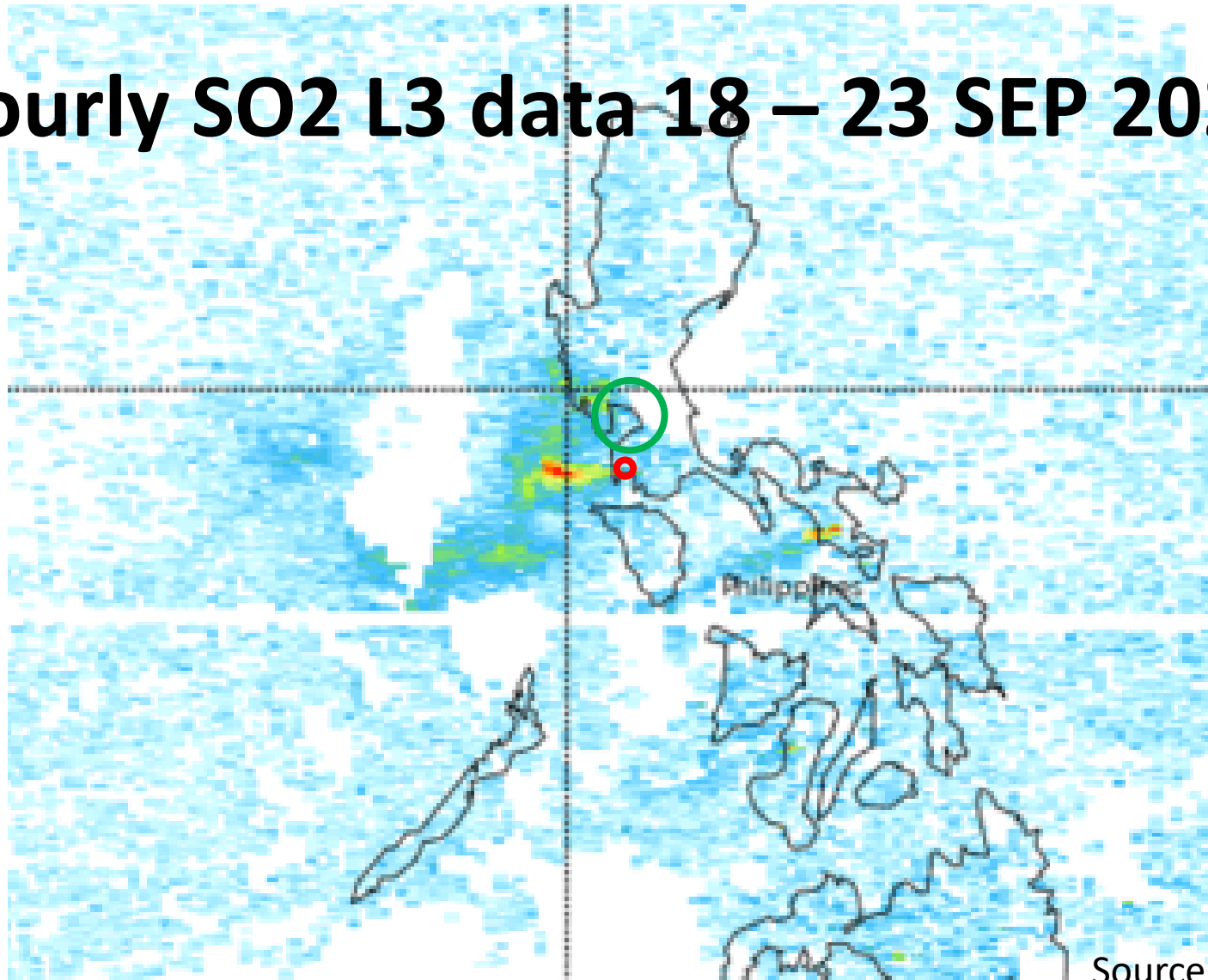
TROPOMI daily SO2 L3 data 18 – 23 SEP 2023



- Metro Manila
- Taal Volcano

Source: DLR

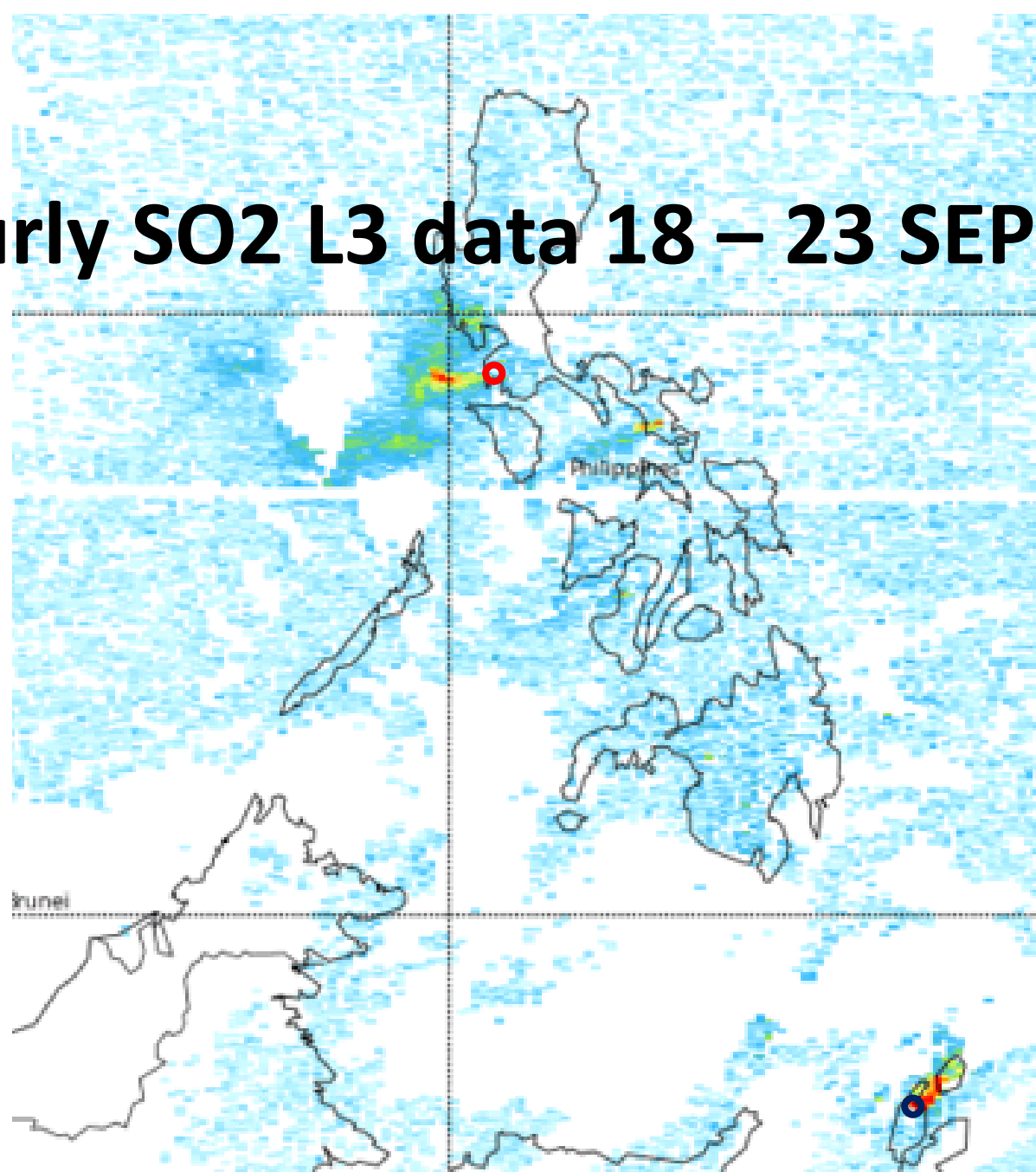
GEMS hourly SO2 L3 data 18 – 23 SEP 2023



- Metro Manila
- Taal Volcano

Source: NIER

GEMS hourly SO2 L3 data 18 – 23 SEP 2023



- Taal Volcano
- Dukono Volcano

Source: NIER