

The impact of 7.3 Magnitude Earthquake on Vanuatu, Dec 17, 2024

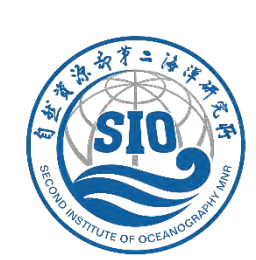
Satellite-Derived Damage Observation



State Key Laboratory of Satellite Ocean Environment Dynamics, Second Institute of Oceanography, MNR, China



China Center for Resource Satellite Data and Applications, CASC, China



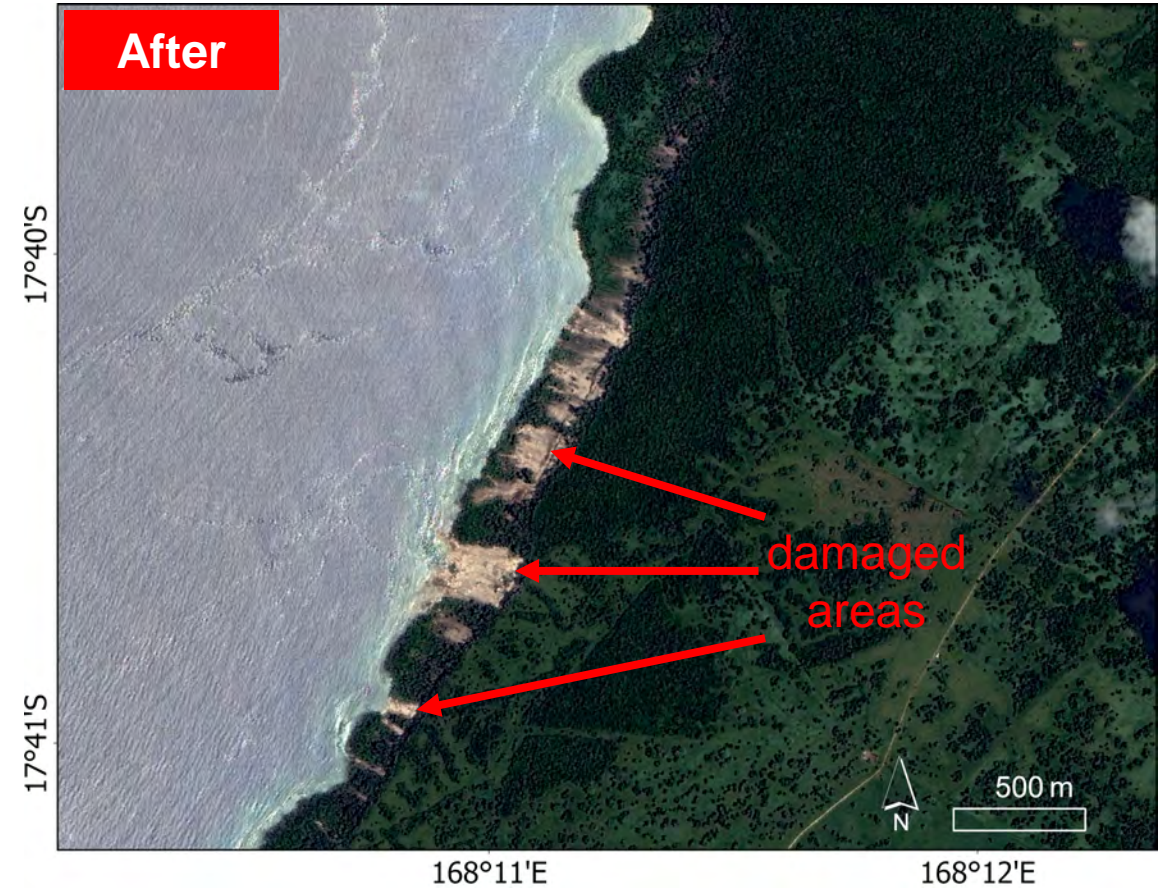
I



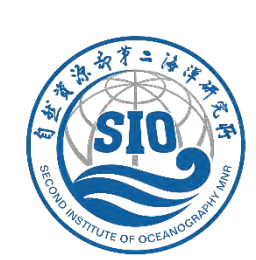
On the western Efate island, several severely damaged areas were observed.



Sentinel-2B / 13 Dec. 2024



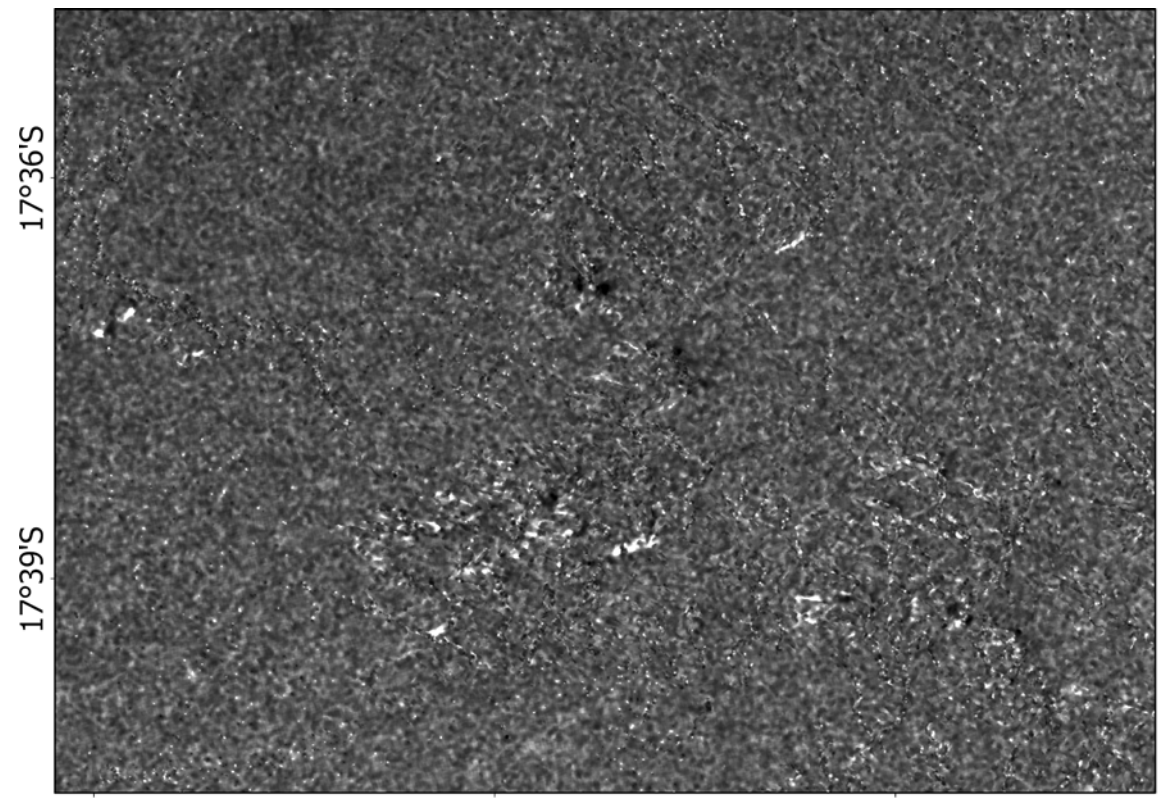
ZY-1F / 19 Dec. 2024



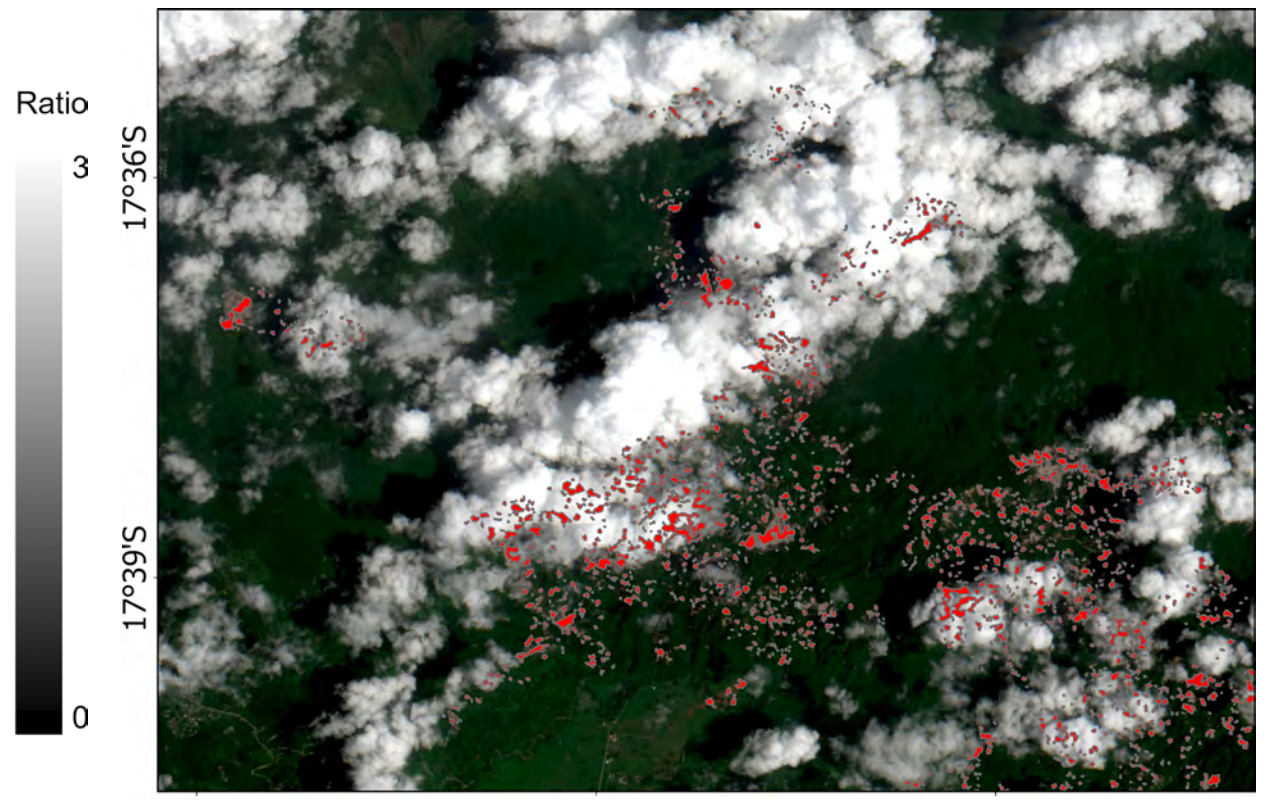
II



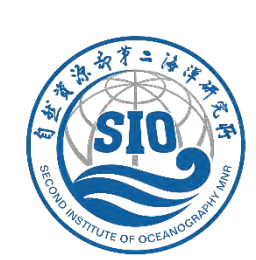
- Using pre- and post-earthquake SAR data, signal ratios were calculated, and strongly variable regions were extracted using thresholding. These regions (highlighted as red patches in the right image) align well with landslide areas identified in optical imagery.



Sentinel-1A / Ratio between 05 Dec. 2024 & 17 Dec. 2024



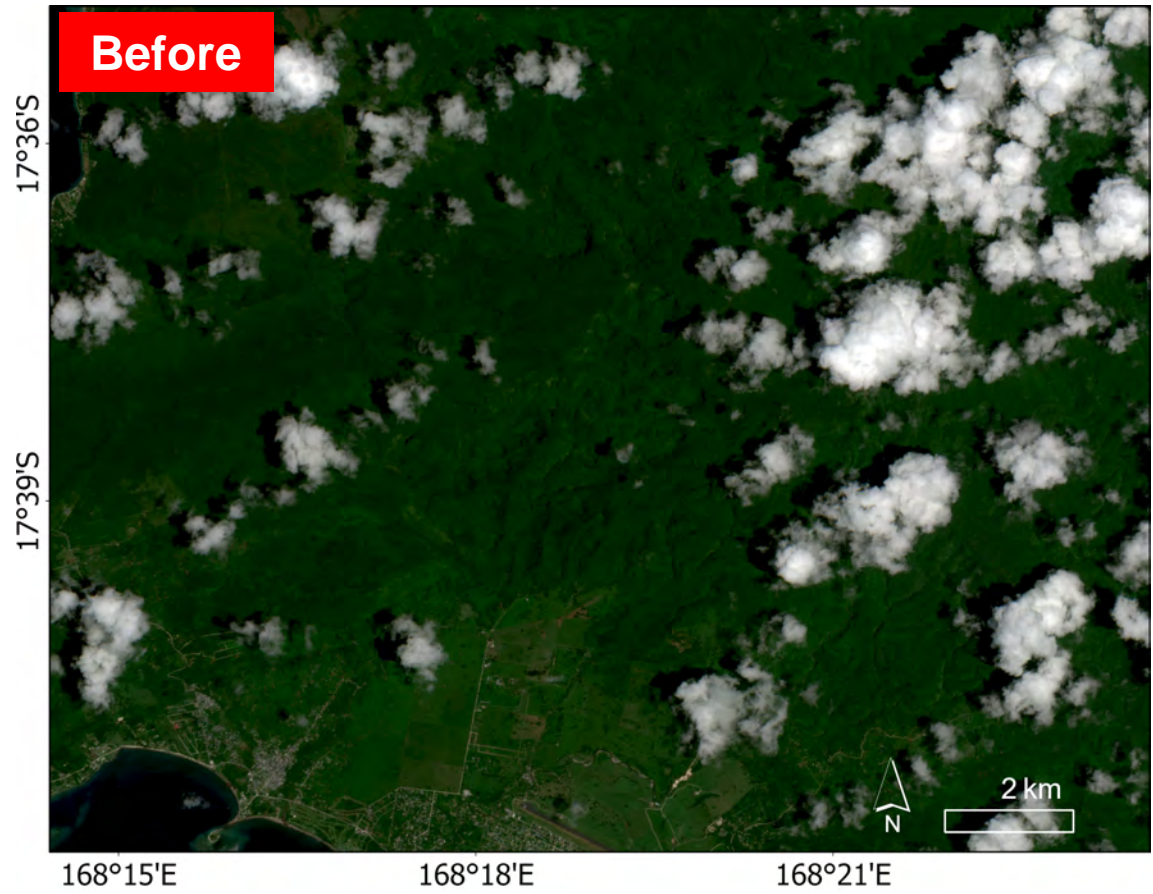
Sentinel-2A / 19 Dec. 2024



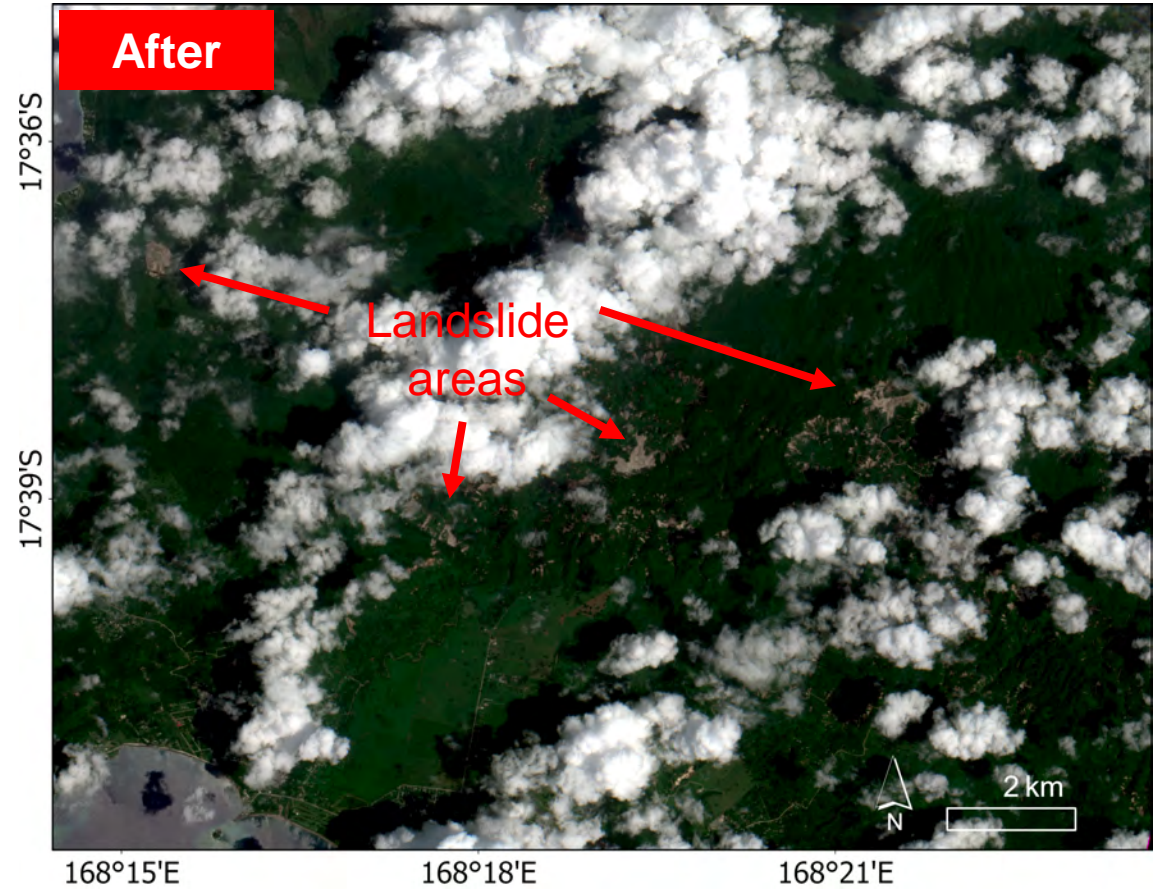
II



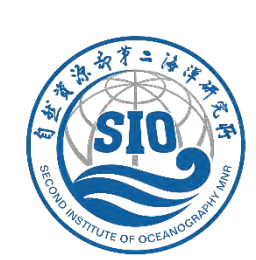
Zoomed-in satellite images of Efate Island reveal severe landslides.



Sentinel-2A / 15 Dec. 2024



Sentinel-2A / 19 Dec. 2024



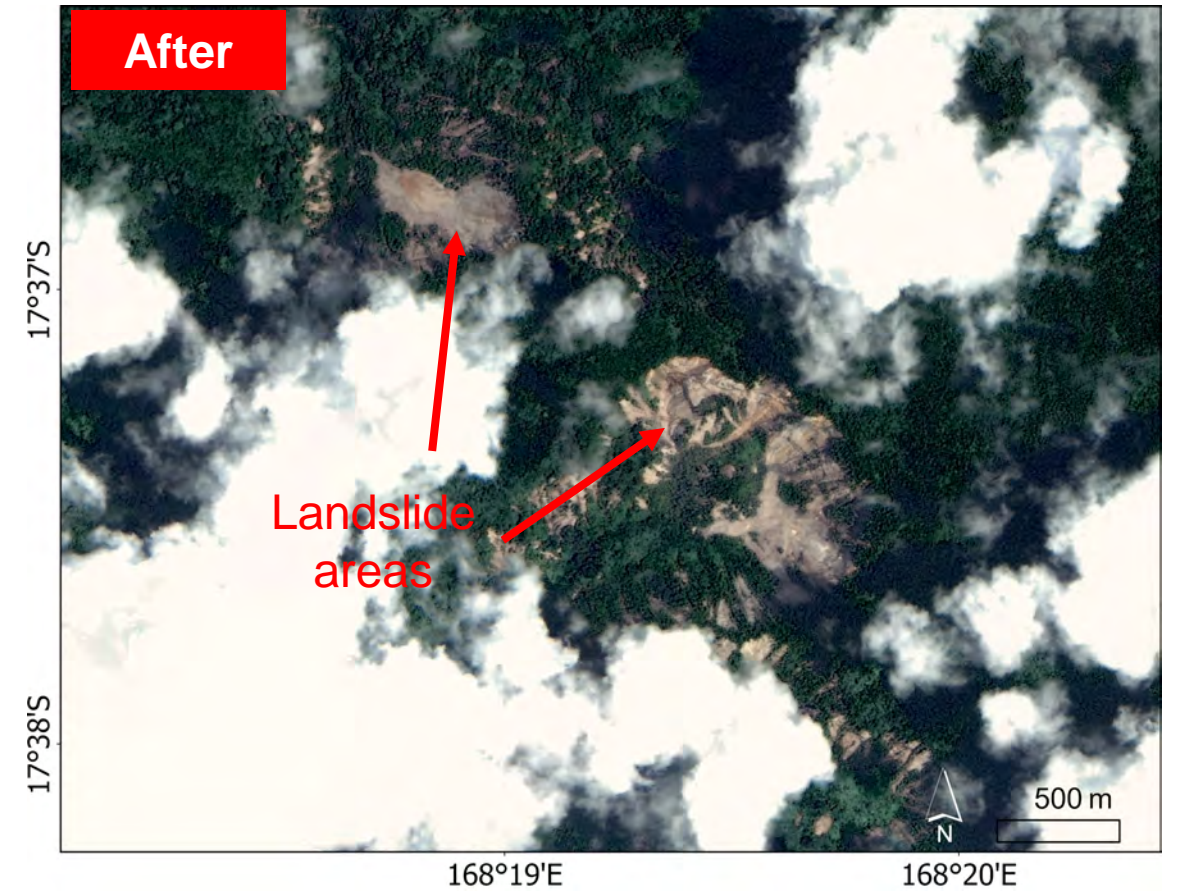
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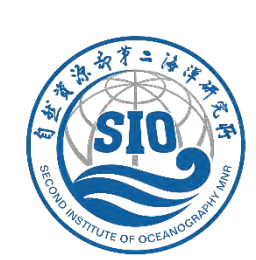
Zoomed-in satellite images of Efate Island reveal severe landslides.



Sentinel-2A / 15 Dec. 2024



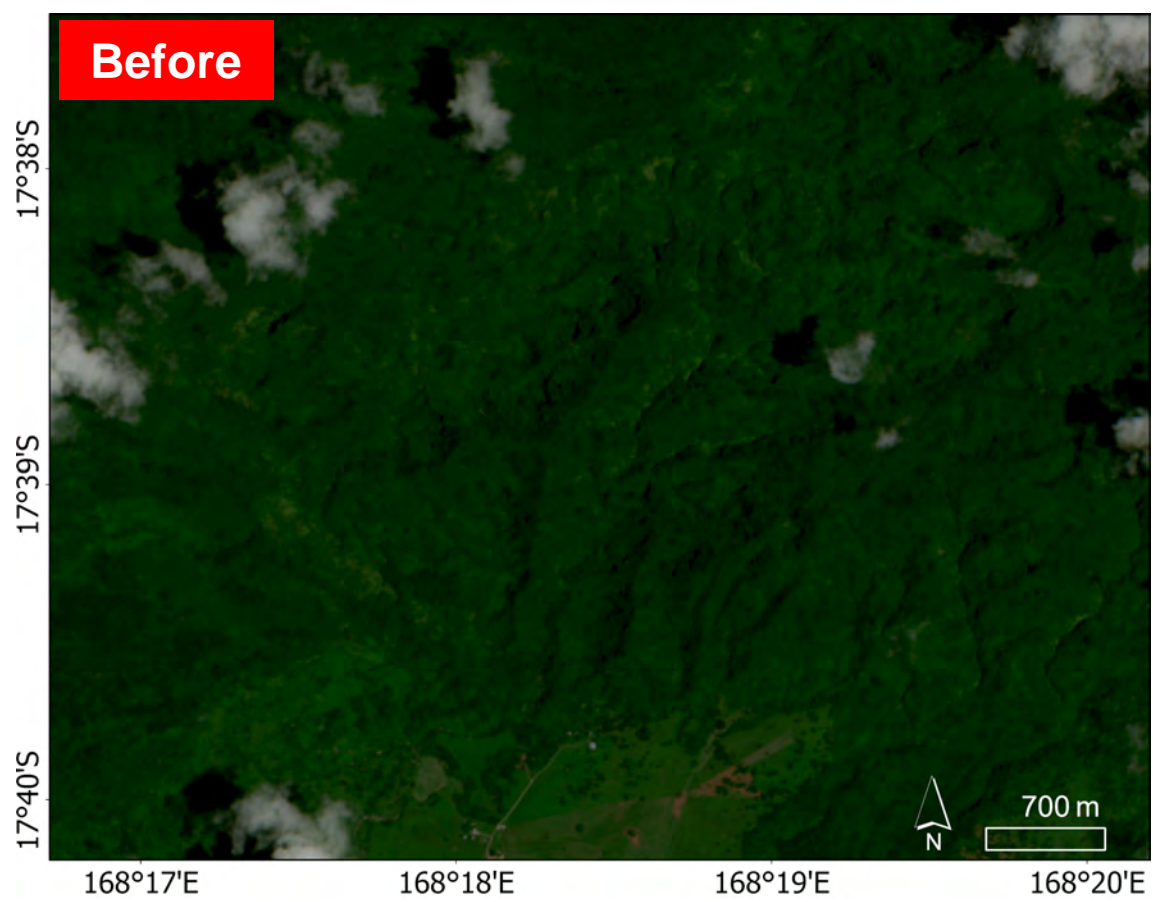
ZY-1F / 19 Dec. 2024



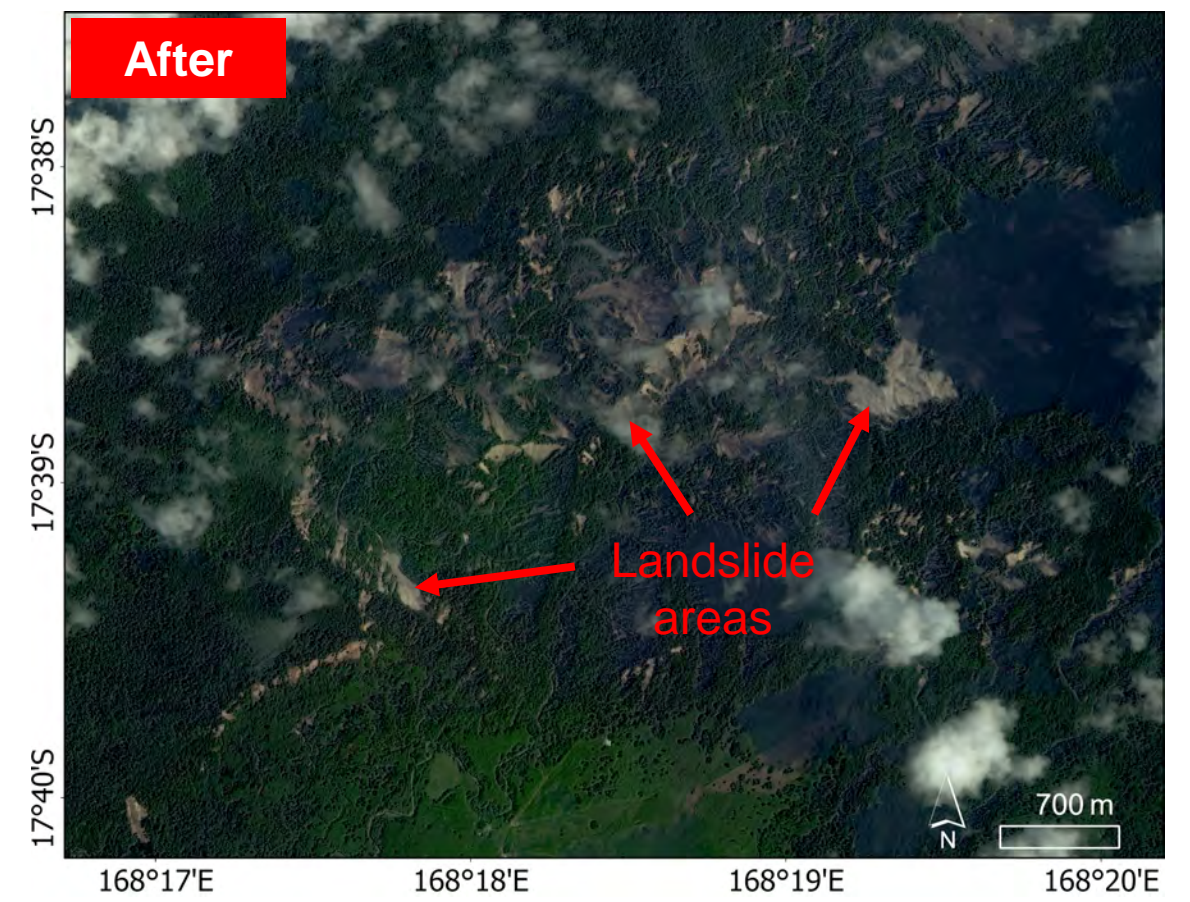
II



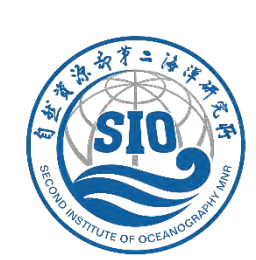
Zoomed-in satellite images of Efate Island reveal severe landslides.



Sentinel-2A / 15 Dec. 2024



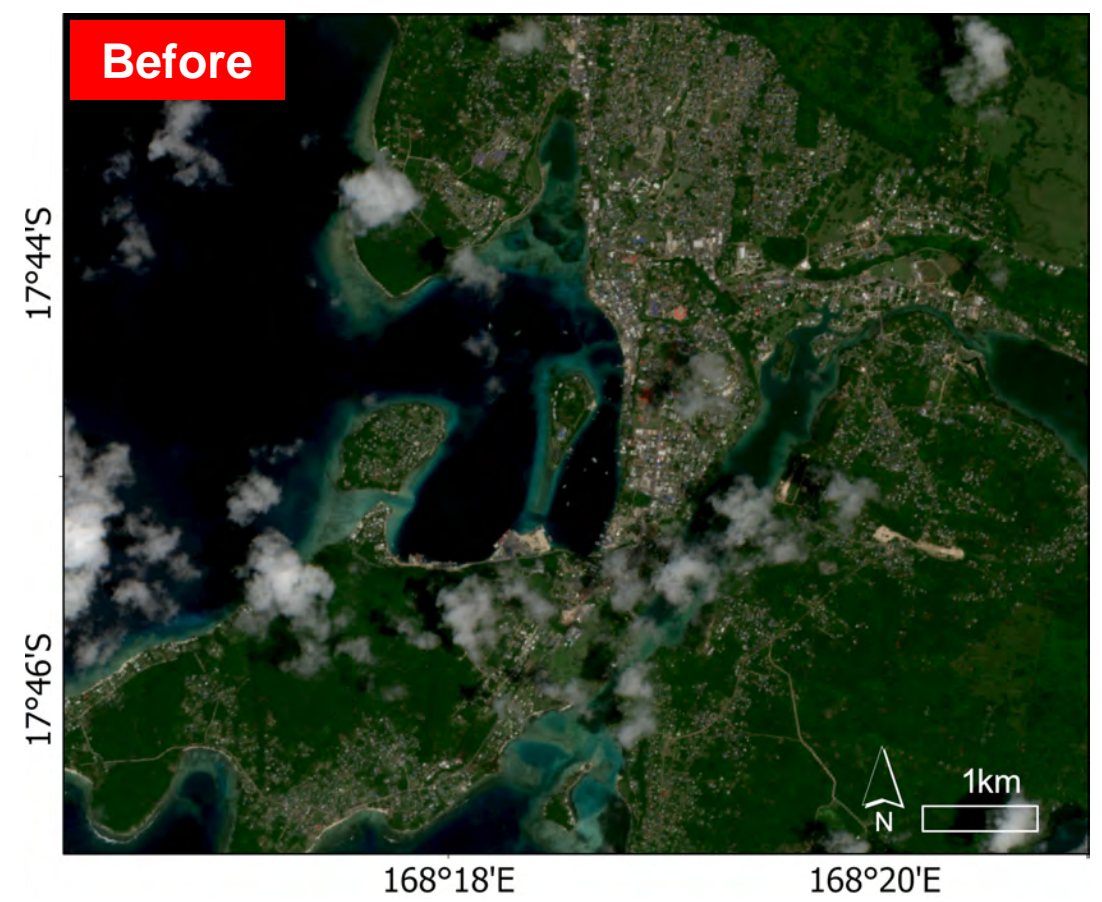
GF-1C / 18 Dec. 2024



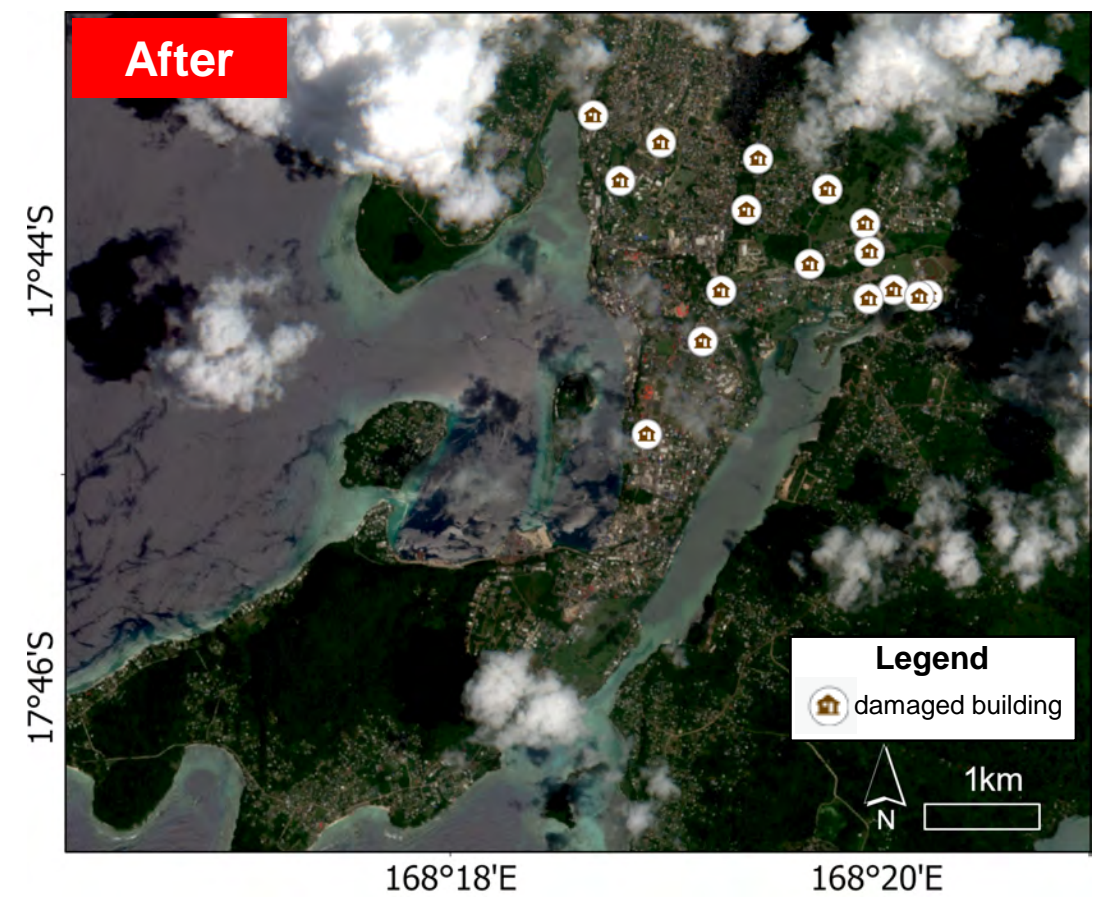
III



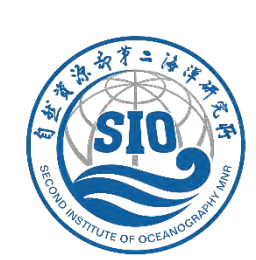
We identified 16 damaged buildings in Port Vila using optical images before and after the earthquake.



Sentinel-2A / 15 Dec. 2024



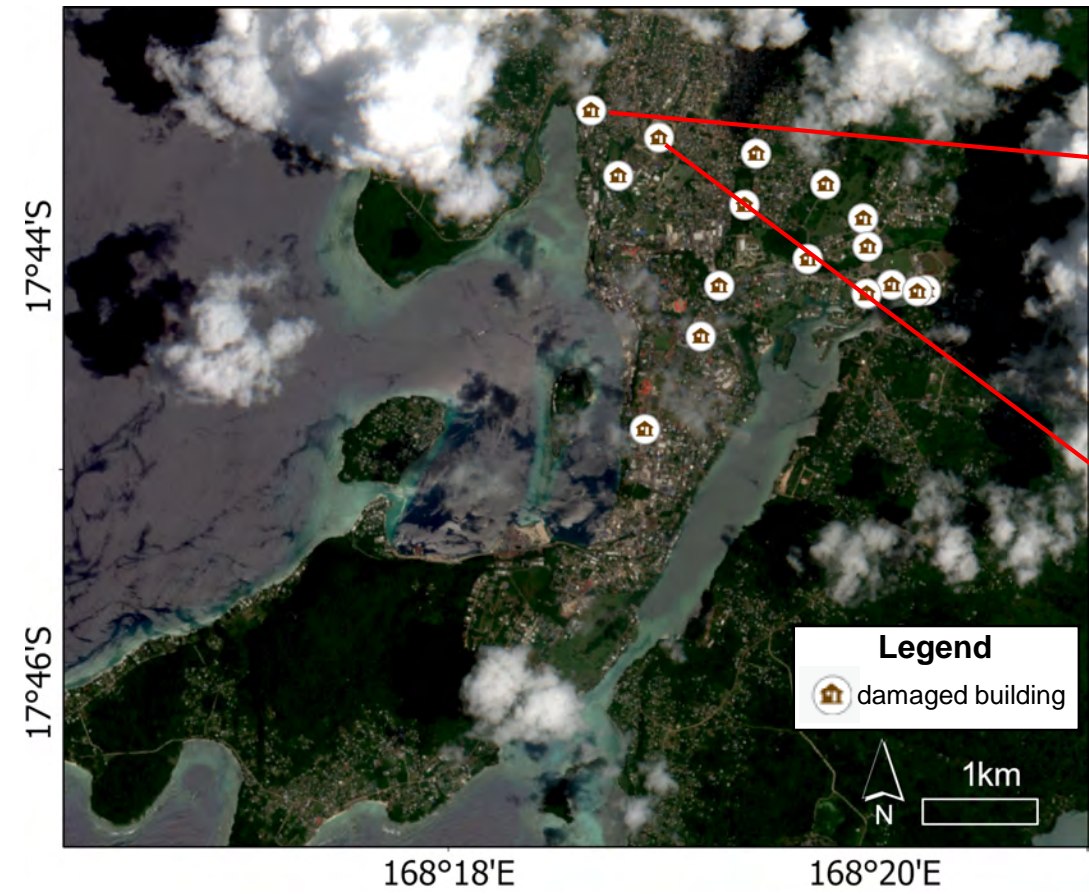
Sentinel-2A / 19 Dec. 2024



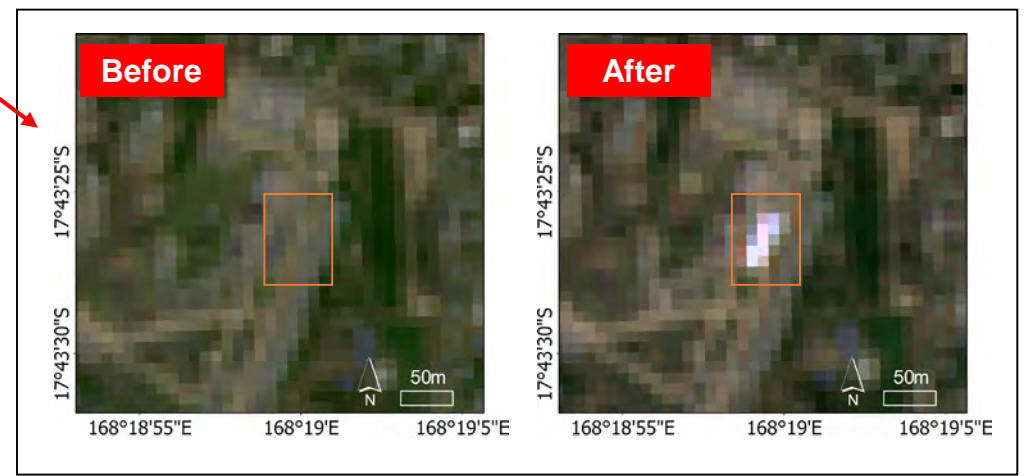
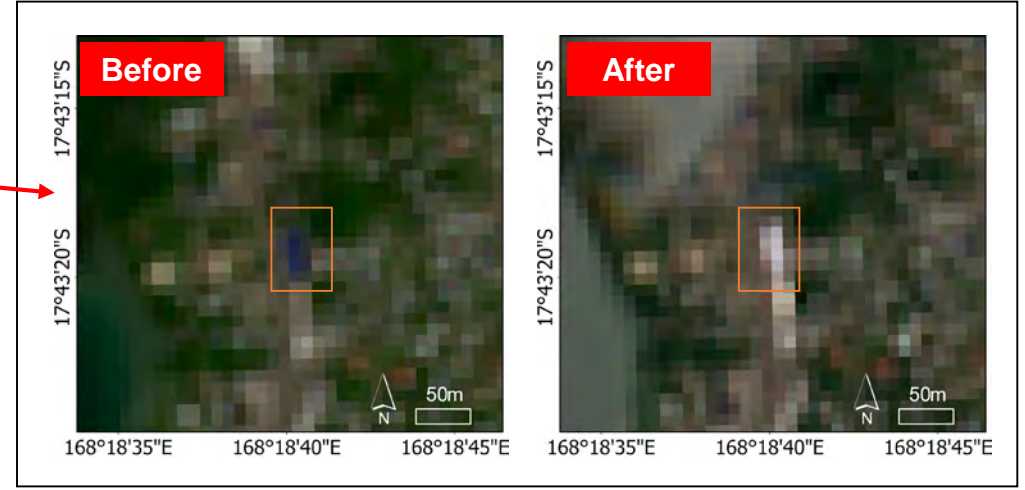
III



Zoomed-in satellite images



Sentinel-2A / 19 Dec. 2024





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Data sources:

(1) Satellite Image (Post-event):

GF-1C: 18 Dec. 2024

Resolution: 2 m

ZY-1F: 19 Dec. 2024

Resolution: 2.5 m

Copyright: @ China Center for Resource Satellite Data and Applications

Sentinel-1A: 17 Dec. 2024

Sentinel-2A: 19 Dec. 2024

Resolution: 10 m

Copyright: @ European Space Agency

(2) Satellite Image (Pre-event):

Sentinel-1A: 05 Dec. 2024

Sentinel-2A: 15 Dec. 2024

Sentinel-2B: 13 Dec. 2024

Resolution: 10 m

Copyright: @ European Space Agency

Spatial Reference:

Name: WGS 1984 UTM Zone 58S

PCS: WGS 1984 UTM Zone 58S

GCS: GCS WGS 1984

Datum: WGS 1984

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