

Space Weather Activities in Indonesia

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Instrumentation map



Solar Monitoring at Bosscha Observatory (3), Tanjungsari (4), Watukosek (6), and Manado (8), Biak (11)

Ionospheric phenomena at Kototabang (1), Bandung (2), Tanjungsari (4), Pameungpeuk (5), Pontianak (7), Manado (8), Kupang (10), Biak (11)

GPS at Bandung (2), Tanjungsari (4), Pontianak (7), Manado (8), Kupang (10), Biak (11)

Upper atmosphere at Kototabang (1) and Watukosek (6)

Radio communication at Kototabang (1), Bandung (2), Tanjungsari (4), Watukosek (6), Pontianak (7), Manado (8), Kupang (10), Biak (11)

Magnetometer at Kototabang (1), Pameungpeuk (5), Watukosek (6), Pontianak (7), Manado (8), Pare-pare (9), Kupang (10), Biak (11)

Collaborations

National Institute of Information and Communications Technology (NICT) Japan; Research Institute for Sustainable Humanosphere (RISH), Kyoto University, Japan; Space Environment Research Center (SERC), Kyushu University, Japan; IPS Australia (Asia Oceania Space Weather Alliances), SEALION

Detail Instrumentations

1. Kototabang (0.3°S; 100.35°E)

- Ionosonde frequency-modulated continuous wave (FM/CW); Airglow Monitor; VHF Radar; Ionospheric Scintillation Monitor (ISM); Automatic Link Establishment (ALE); GNU Radio Beacon Receiver (GRBR); Magnetometer; Equatorial Atmosphere Radar (EAR); Ceilometers; X-band radar

2. Bandung (6.90°S; 107.60°E)

- GNSS Ionospheric Scintillation and TEC Monitor (GISTM); GPS Leica; VHF/HF Wind Radio; ALE (Automatic Link Establishment); VLF-Receiver

3. Bosscha Observatory (6.8°S; 107.61°E)

- Callisto radio spectrometer; Radio JOVE; Multiwavelength solar telescopes (Ha, Call, White-light)

4. Tanjungsari (6.91°S; 107.83°E)

- GPS-TEC; Ionosonde; GNU Radio Beacon Receiver (GRBR); Solar Radio Spectrograph SN4000; Sunspot sketch; Callisto radio spectrometer

5. Pameungpeuk (7.65°S; 107.96°E)

- Ionosonde IPS51; Magson fluxgate magnetometer

6. Watukosek (7.57°S; 112.68°E)

- Automatic Link Establishment (ALE); GNU Radio Beacon Receiver (GRBR); Magnetometer; Sunspot observation; BREWER Spectrometer; DASIBI Land Ozon Monitor

7. Pontianak (0.03°S; 109.33°E)

- GNSS Ionospheric Scintillation and TEC Monitor (GISTM); GPS-TEC; Ionosonde CADI; MF-radar; VHF/HF Wind Radio; GNU Radio Beacon Receiver (GRBR); AWS, M-AWS; Magnetometer (Magdas 9)

8. Manado (1.34°N; 124.82°E)

- GNSS Ionospheric Scintillation and TEC Monitor (GISTM); GPS-TEC; Ionosonde CADI; Automatic Link Establishment (ALE); GNU Radio Beacon Receiver (GRBR); Magnetometer (Magdas II); Callisto radio spectrometer

9. Pare Pare (3.98°S; 119,65°E)

- Magnetometer (Magdas II)

10. Kupang (10.16°S; 123.67°E)

- GNSS Ionospheric Scintillation and TEC Monitor (GISTM); GPS-TEC; Ionosonda CADI; Automatic Link Establishment (ALE); Magnetometer (Magdas 9).
We will build a **new national observatory** for astronomy and space weather in this area.

11. Biak (1.0°S; 136.0°E)

- GNSS Ionospheric Scintillation and TEC Monitor (GISTM); GPS-TEC; Ionosonda CADI; MWR; Automatic Link Establishment (ALE); GNU Radio Beacon Receiver (GRBR); Magnetometer (Magdas II); Callisto radio spectrometer

Space Weather Information and Forecast Services (SWIFtS)

SWIFtS officially become the 18th member of International Space Environment Service (ISES) as Regional Warning Center (RWC) Indonesia. First Space Weather Services of ISES in South East Asia. Maintained by LAPAN-BRIN

Android application



SWIFtS - LAPAN Space Weather Information Services

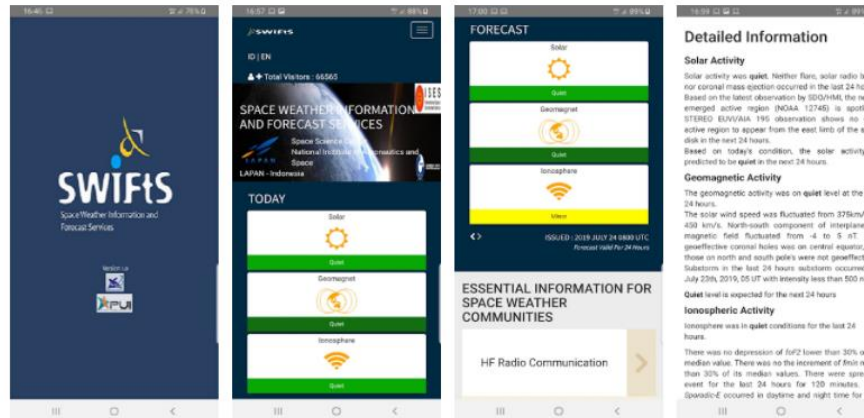
Space Science Center of LAPAN Weather



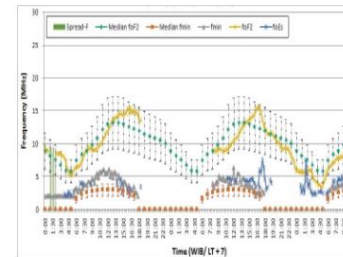
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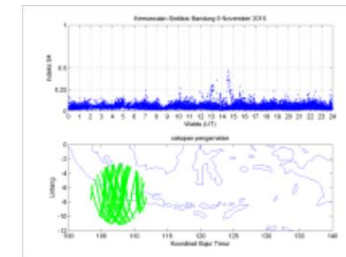
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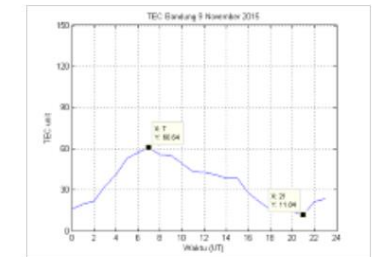
IONOSPHERE & RADIO PROPAGATION



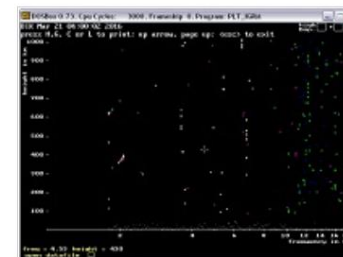
LAPAN foF2 PLOT



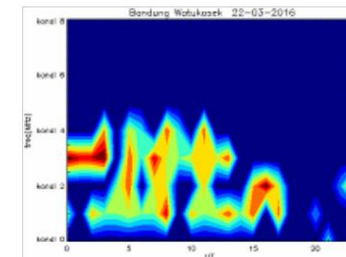
LAPAN S4



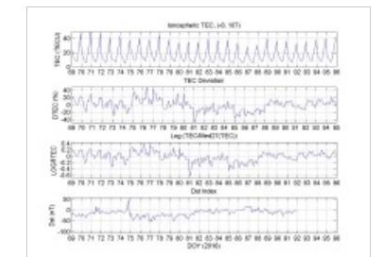
LAPAN TEC



LAPAN IONOGRAM



LAPAN ALE Channel Connectivity



LAPAN IONOSPHERIC TEC DISTURBANCE INDEX

A New Timau National Observatory and TSE 2023

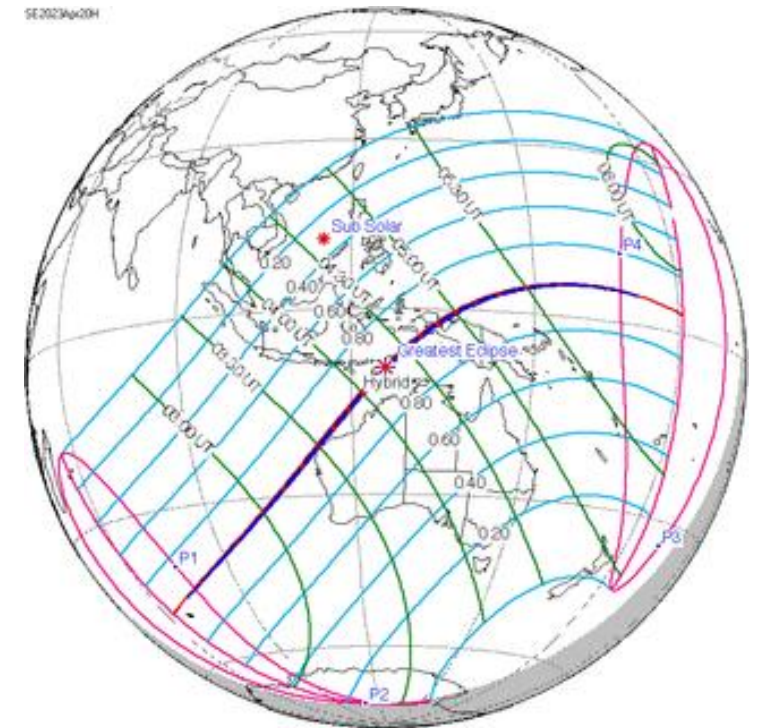
The new Observatory with 3.8m class telescope will be built at Timau mount (1300m) in the East Nusa Tenggara by LAPAN-BRIN. First light will be planned in 2024-2025. Solar telescope and other instruments could be installed in the observatory. Eclipse expedition will be coordinated by ITB and LAPAN-BRIN. Centennial commemoration (1923-2023) of the Bosscha Observatory, ITB will also be held in Bandung.



<https://en.wikipedia.org/wiki/Indonesia>



<https://langitselatan.com/2017/11/08/observatorium-nasional-timau/>



Duration: 76 sec

https://en.wikipedia.org/wiki/Solar_eclipse_of_April_20,_2023

- **Courses**

Space Weather and Heliophysics courses are given at Bandung Institute of Technology (ITB), at least 60 under-graduate students/year. Some topics become undergraduate final projects, thesis, or dissertation. Collaborations are welcome.

- **Public outreach**

Online lectures were performed by ITB and National Institute of Aeronautics and Space (*Indonesian: Lembaga Penerbangan dan Antariksa Nasional, LAPAN*).


We need more sharing material courses, simple data analysis, etc. for STEM (Science, Technology, Engineering, Mathematics) students in space weather or space physics.

- **International Seminars/Workshop**

At least one event is held alternately in every year at LAPAN-BRIN and ITB

- Notes: Now, LAPAN merged into National Research and Innovation Agency (*Indonesian: Badan Riset dan Inovasi Nasional, BRIN*).

Capacity Building: Courses and Public Outreach



We supports the idea and restless effort of data and instruments sharing for development of regional or international open databases and models to carry out scientific research or studies, education and public outreach.

Thank you