Geophysical Research Letters

Supporting Information for

Magnetic Signatures of the January 15 2022 Hunga Tonga–Hunga Ha`apai Volcanic Eruption

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Introduction

The figures here serve to complement those in the main paper. We provide more information on the locations of the Western Samoa, Honolulu, Easter Island, and Papeete observatories; raw data from each observatory; and the spectrograms resulting from the cross-wavelet analysis (for both a maximum period of 30 minutes and 120 minutes) of each observatory using the Alice Springs observatory as the remote station.
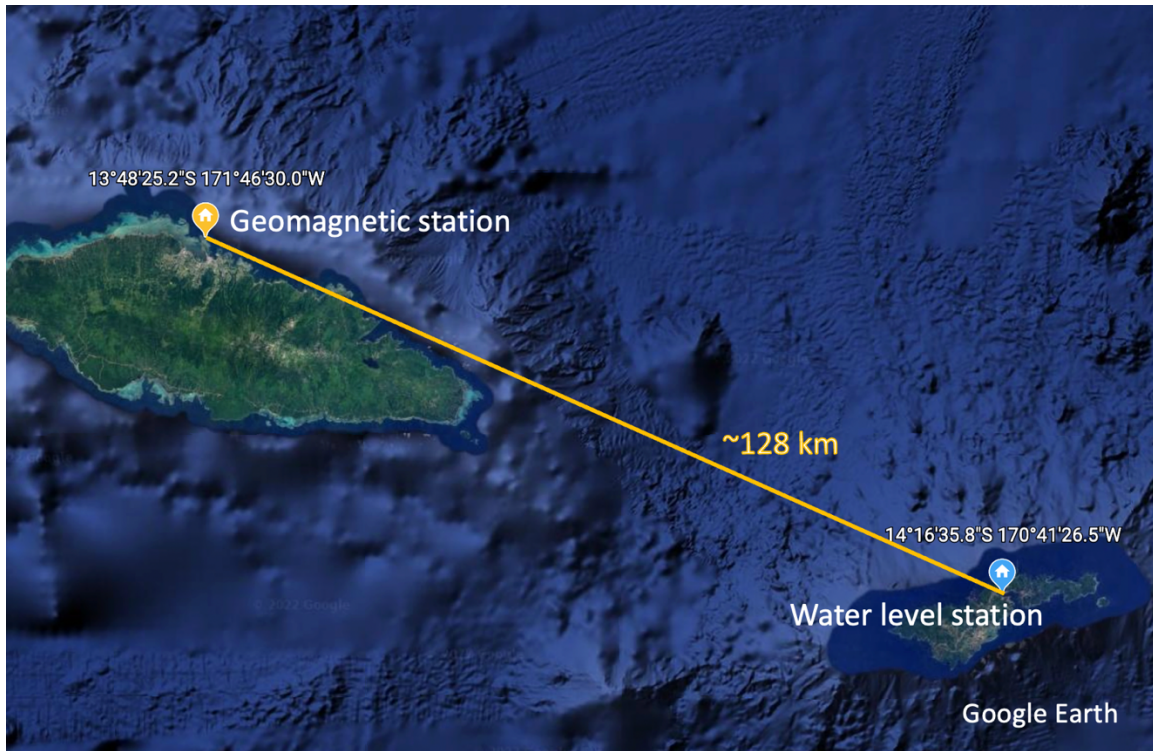
Detailed view of the observatory locations

Figure S1. Location of the Western Samoa geomagnetic observatory relative to the water level station.

Figure S2. Location of the Honolulu, USA geomagnetic observatory relative to the coast.

Figure S3. Location of the Easter Island, Chile geomagnetic observatory relative to the coast.

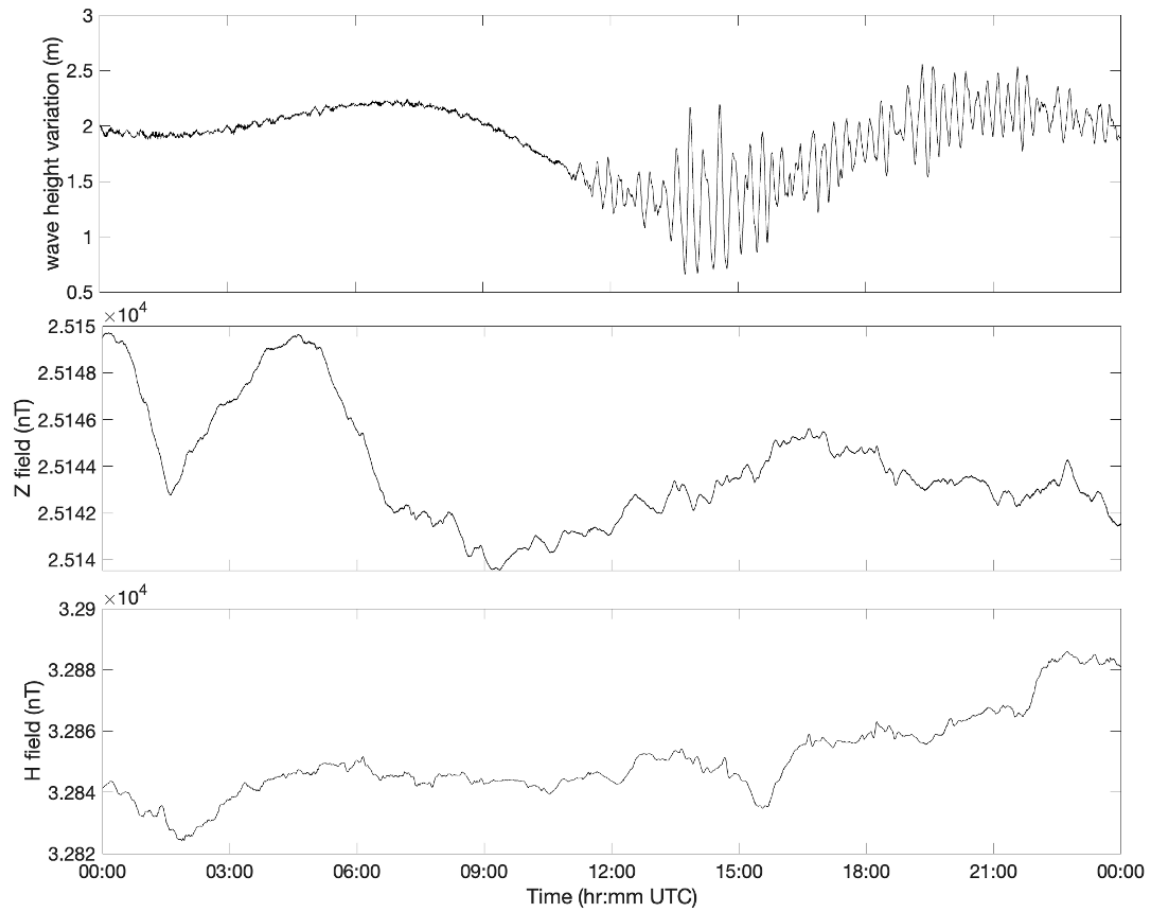**Figure S4.** Location of the Papeete, Tahiti, French Polynesia geomagnetic observatory relative to the coast.

Raw data at Japanese observatories

Figure S5. Raw water level variation and magnetic field data at Chichijimi Island (CBI).
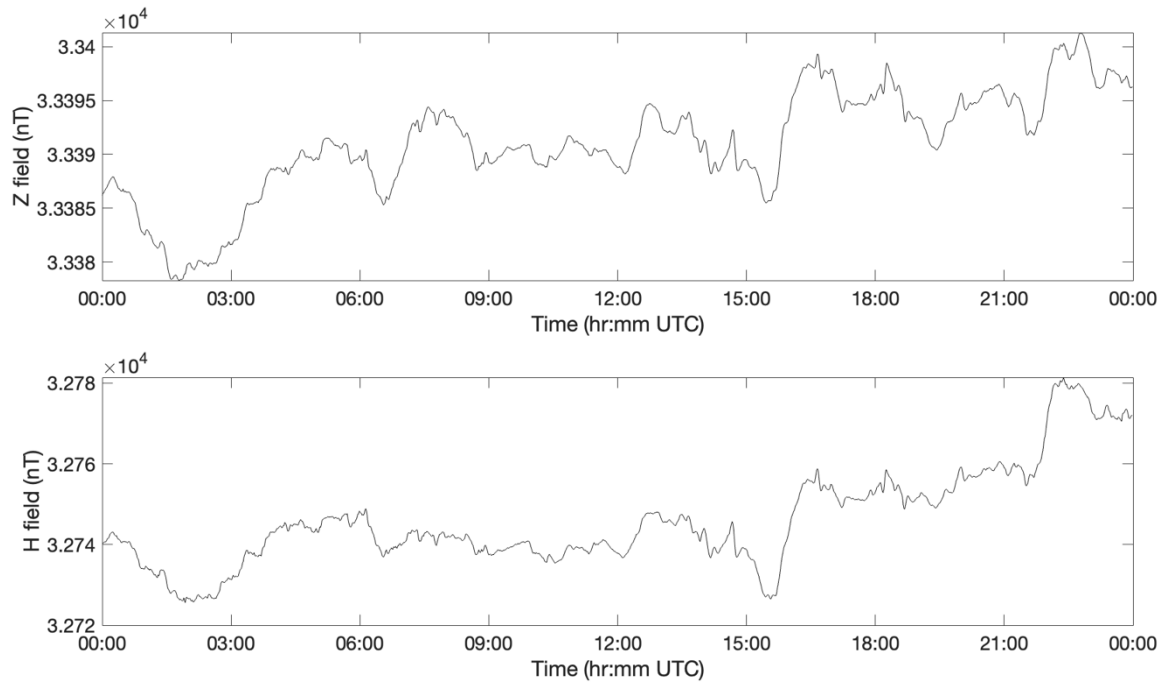
Figure S6. Raw magnetic field data at Kanoya (KNY).
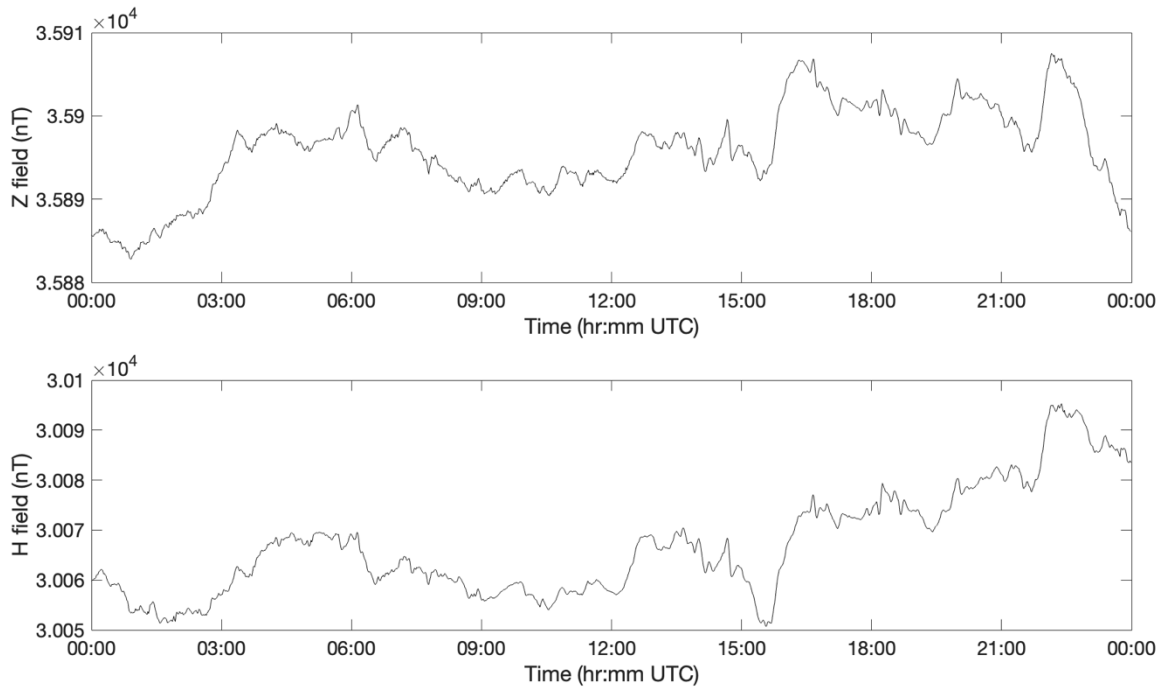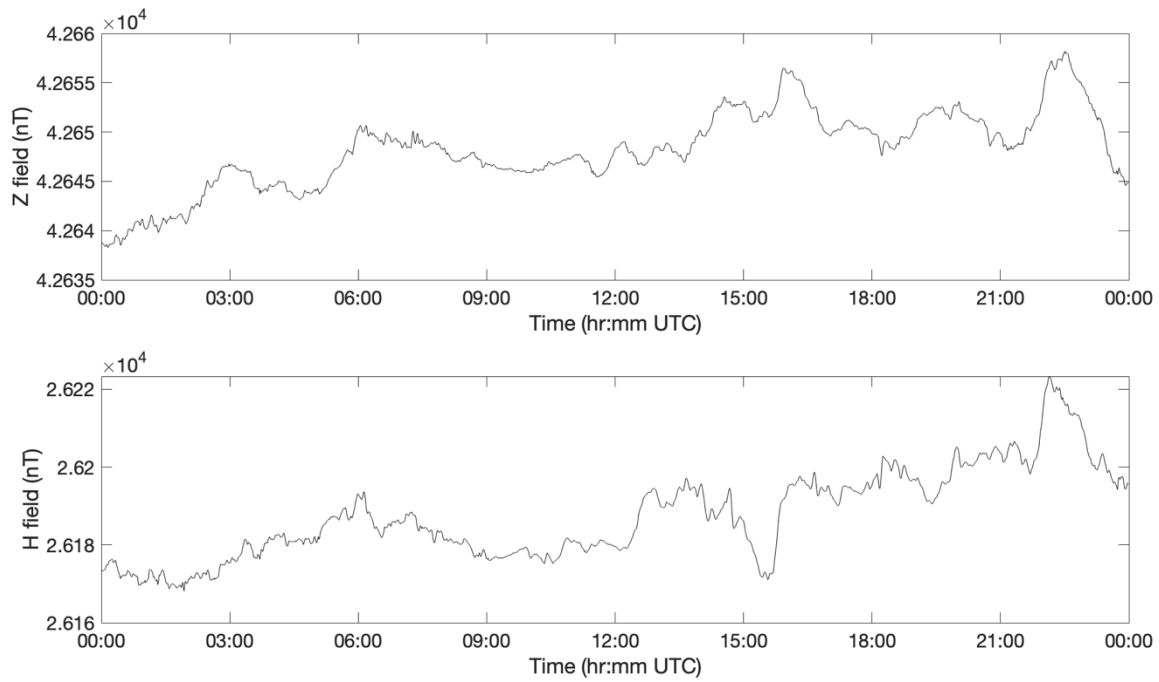

Figure S7. Raw magnetic field data at Kakioka (KAK).

Figure S8. Raw magnetic field data at Memambetsu (MMB).
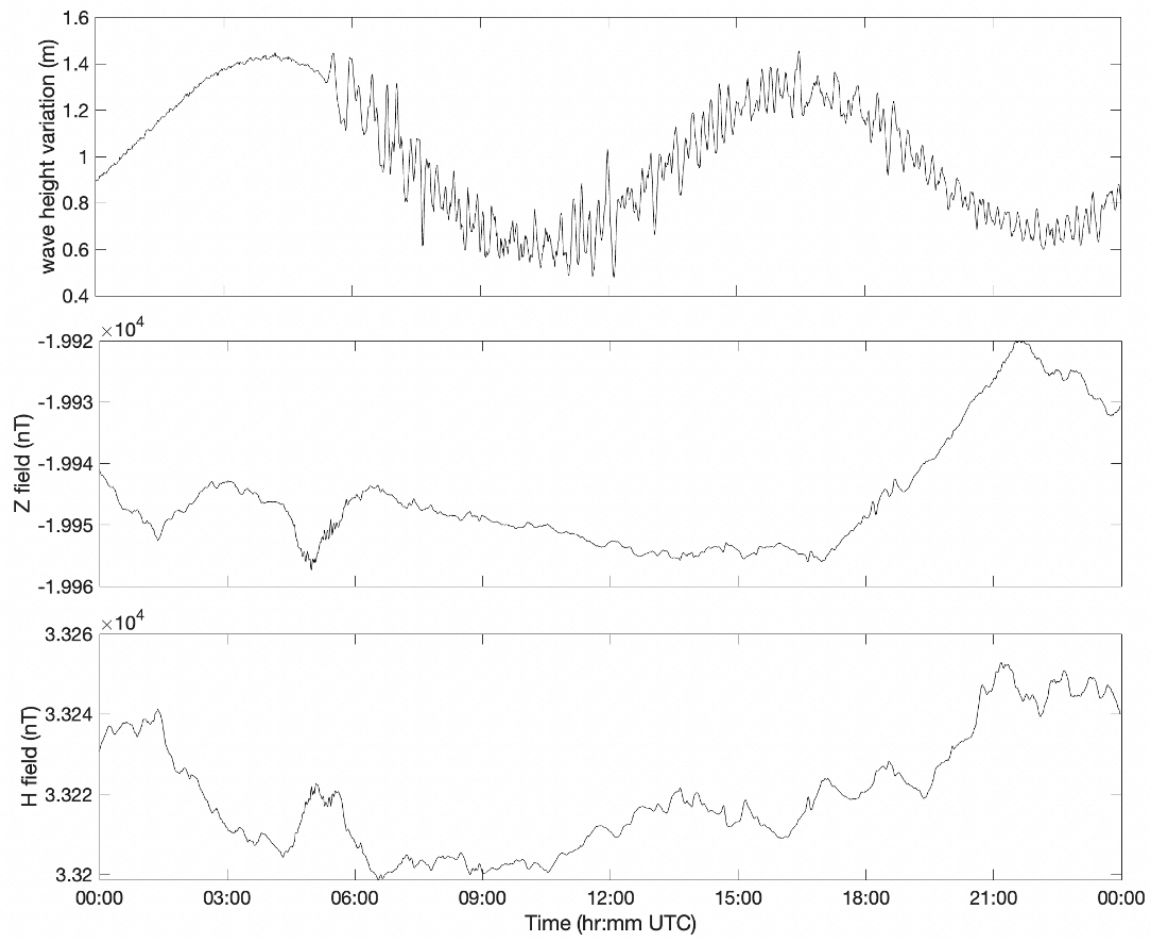
Raw data at Oceania observatories

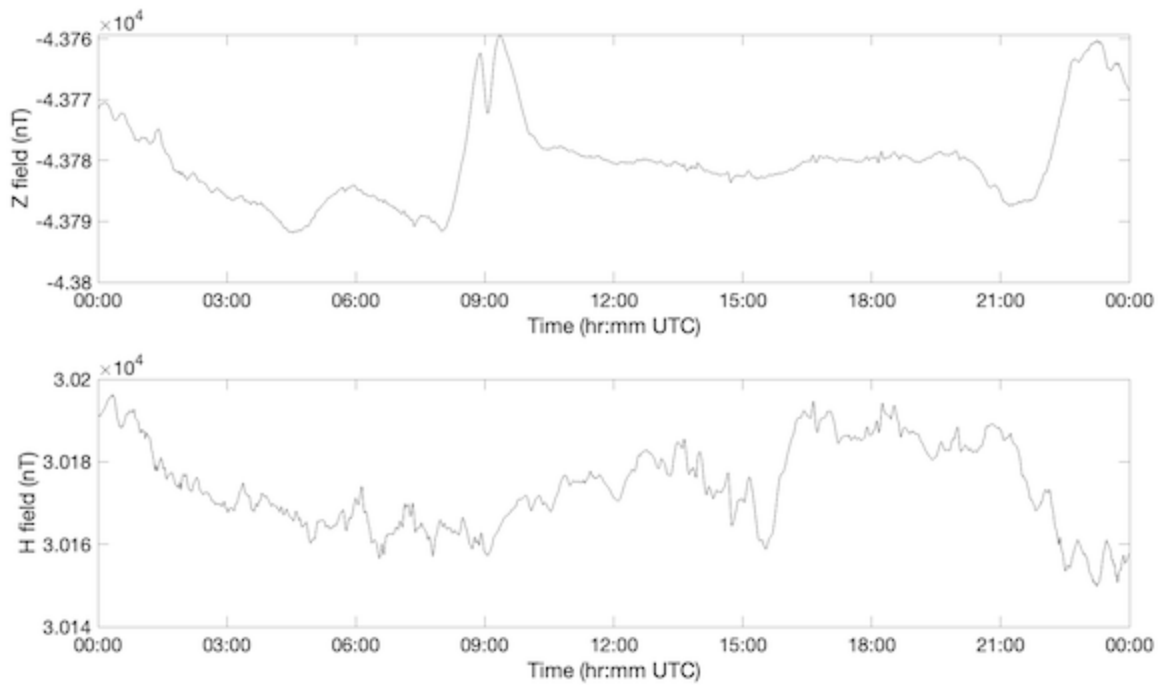**Figure S9.** Raw water level variation and magnetic field data at Western Samoa (API).

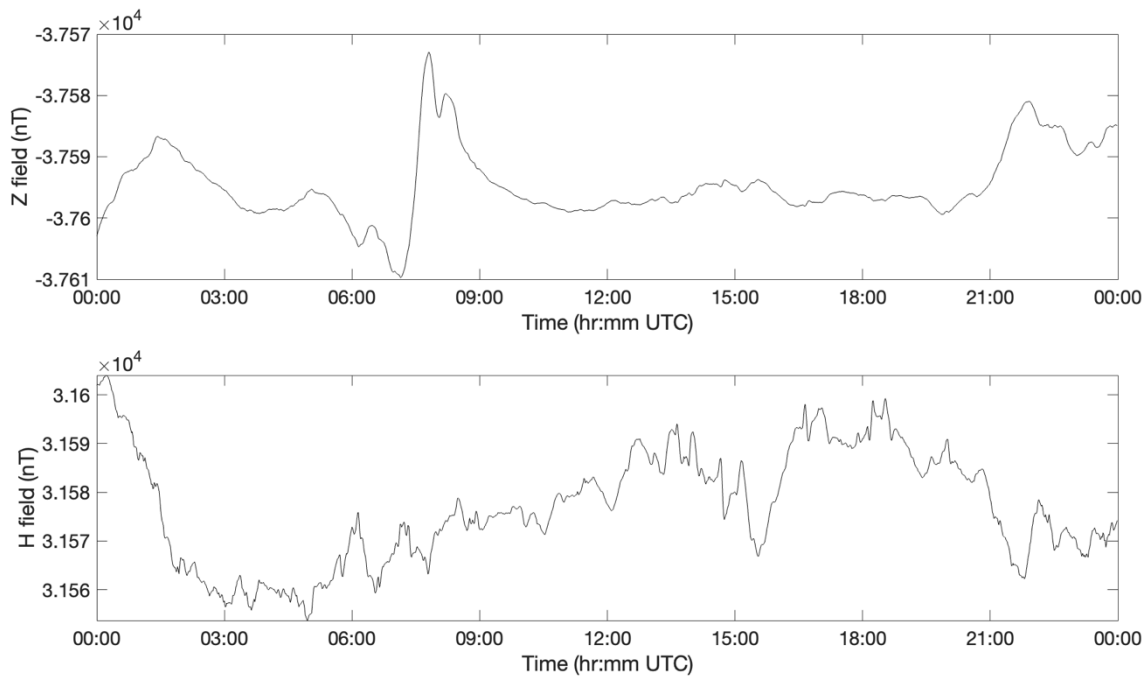**Figure S10.** Raw magnetic field data at Alice Springs, Australia (ASP).

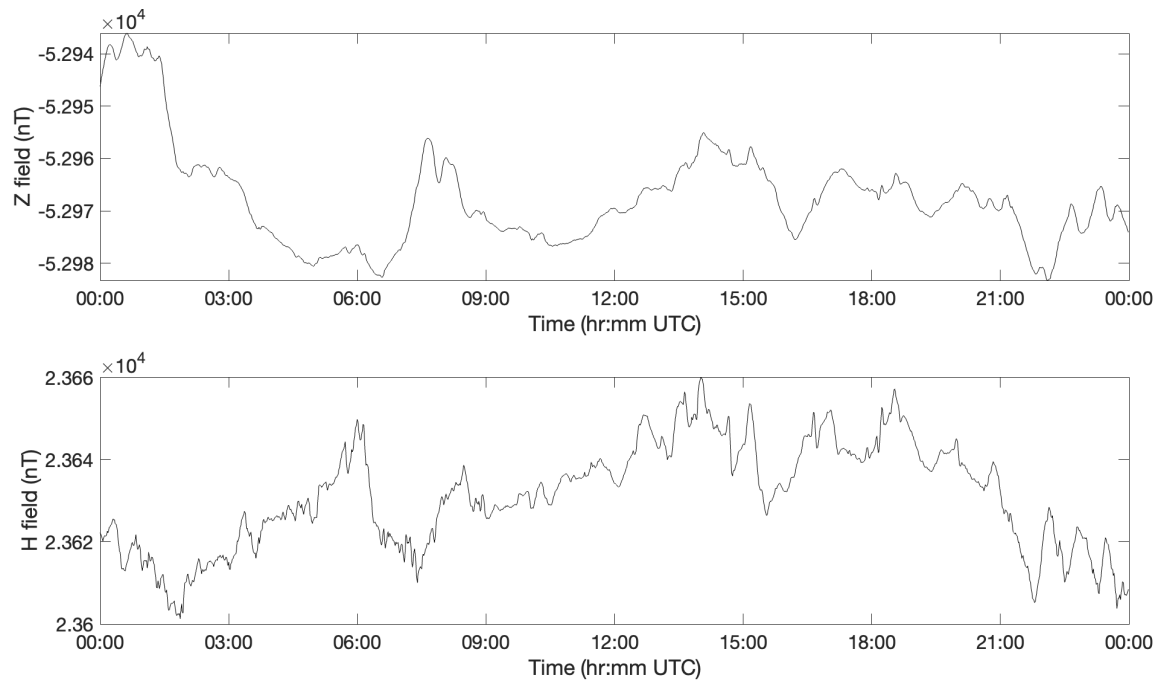**Figure S11.** Raw magnetic field data at Charter Towers, Australia (CTA).

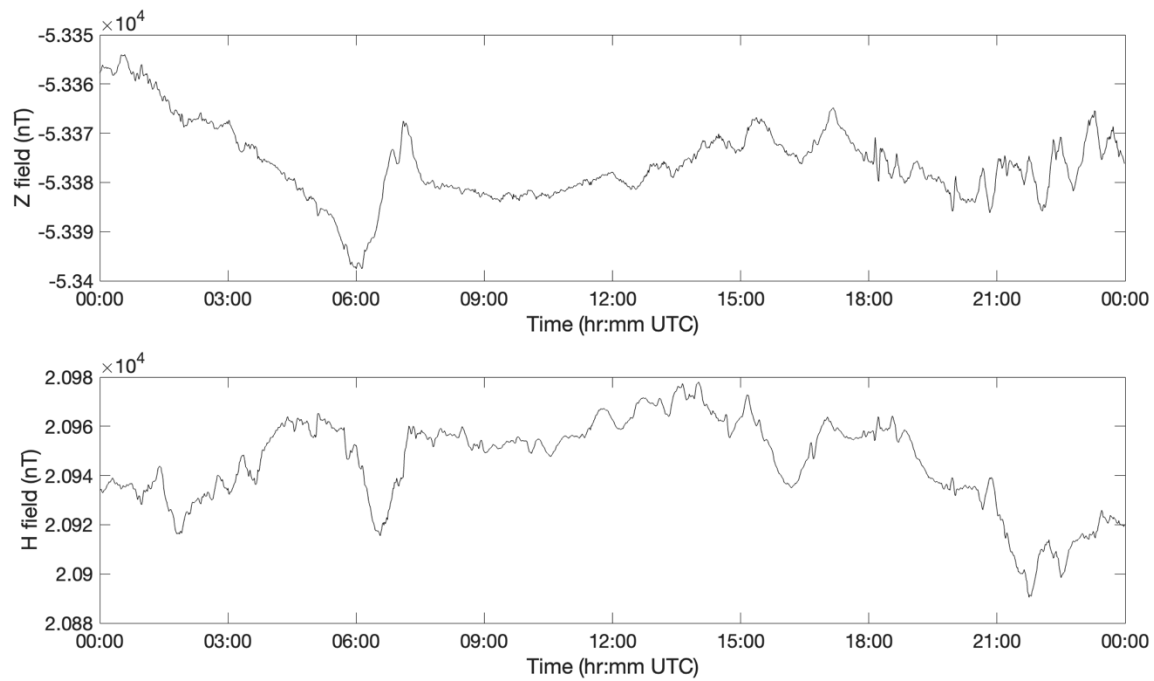**Figure S12.** Raw magnetic field data at Canberra, Australia (CNB).

Figure S13. Raw magnetic field data at Eyrewell, New Zealand (EYR).
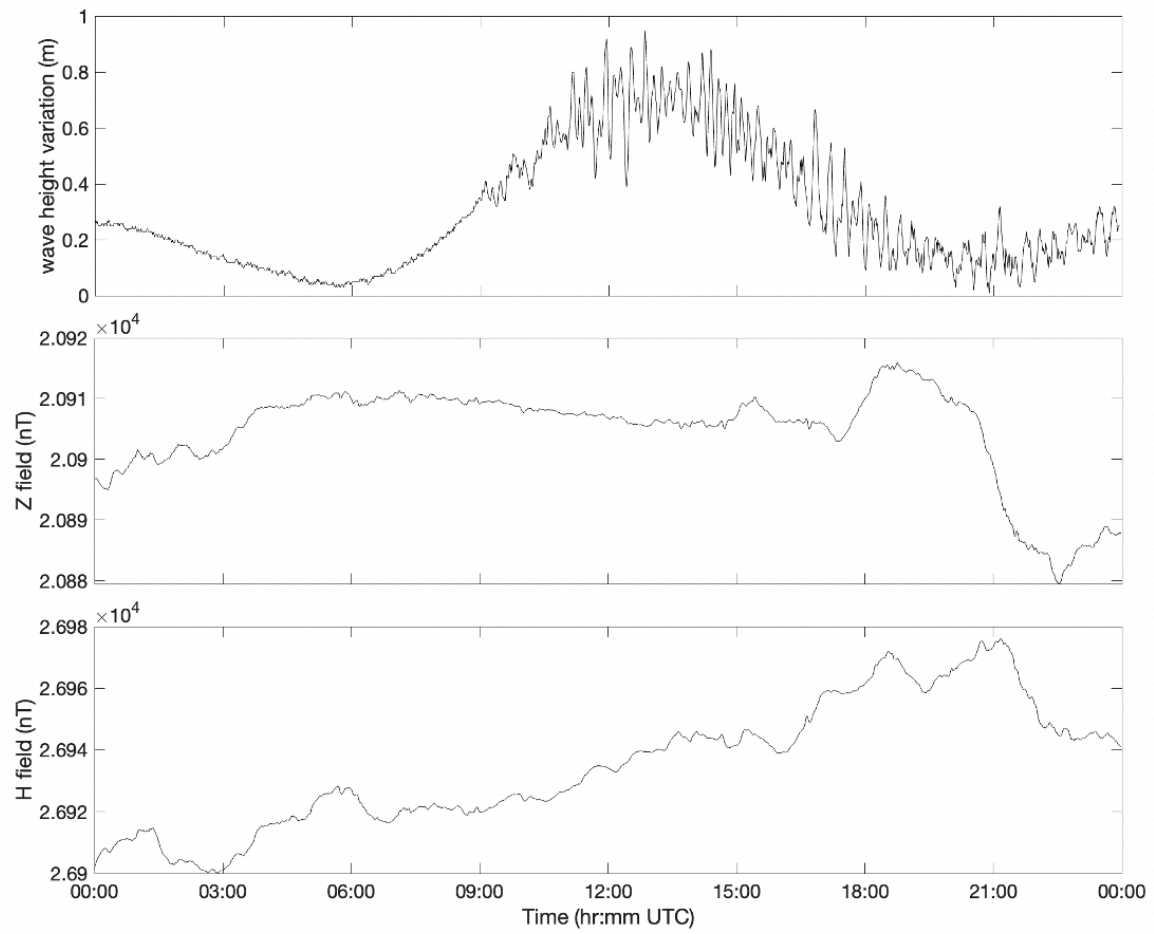
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Raw data at mid-Pacific observatories

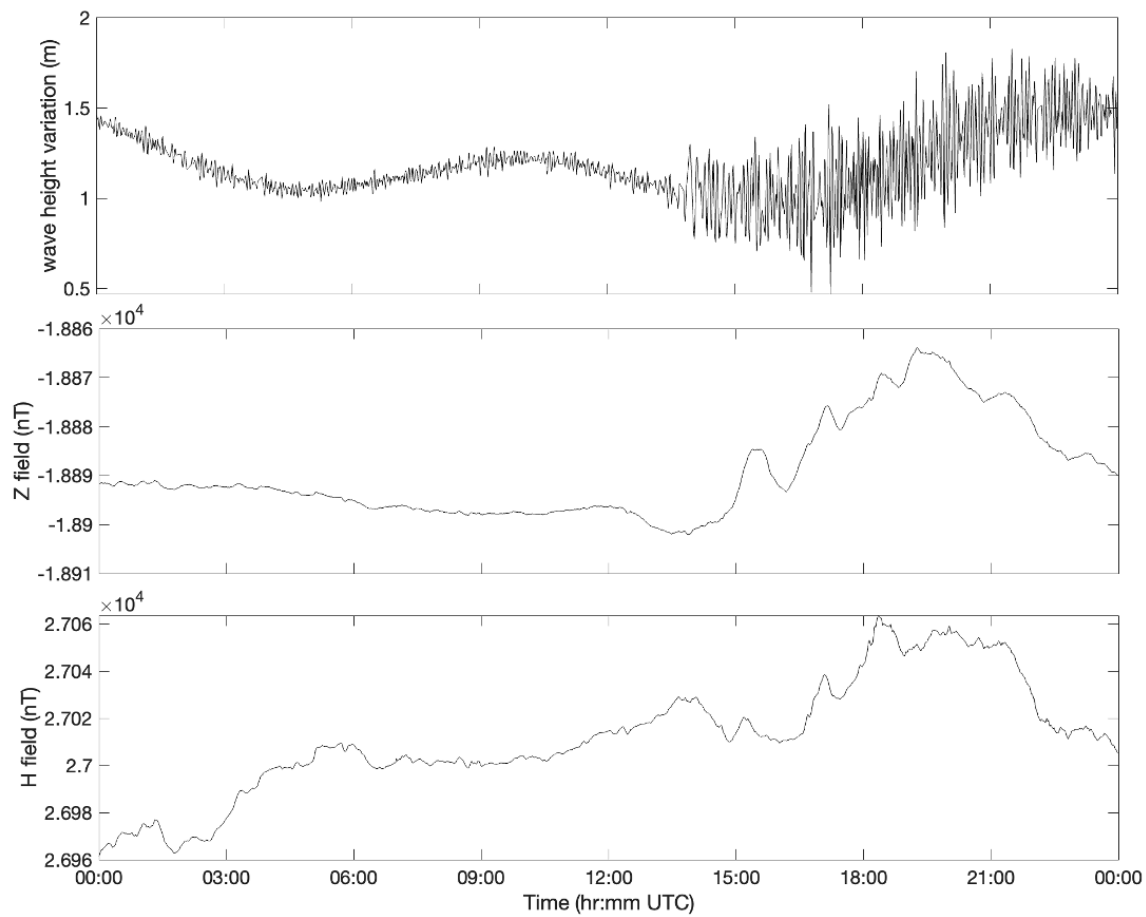**Figure S14.** Raw water level variation and magnetic field data at Honolulu, USA (HON).

Figure S15. Raw water level variation and magnetic field data at Easter Island, Chile (IPM).
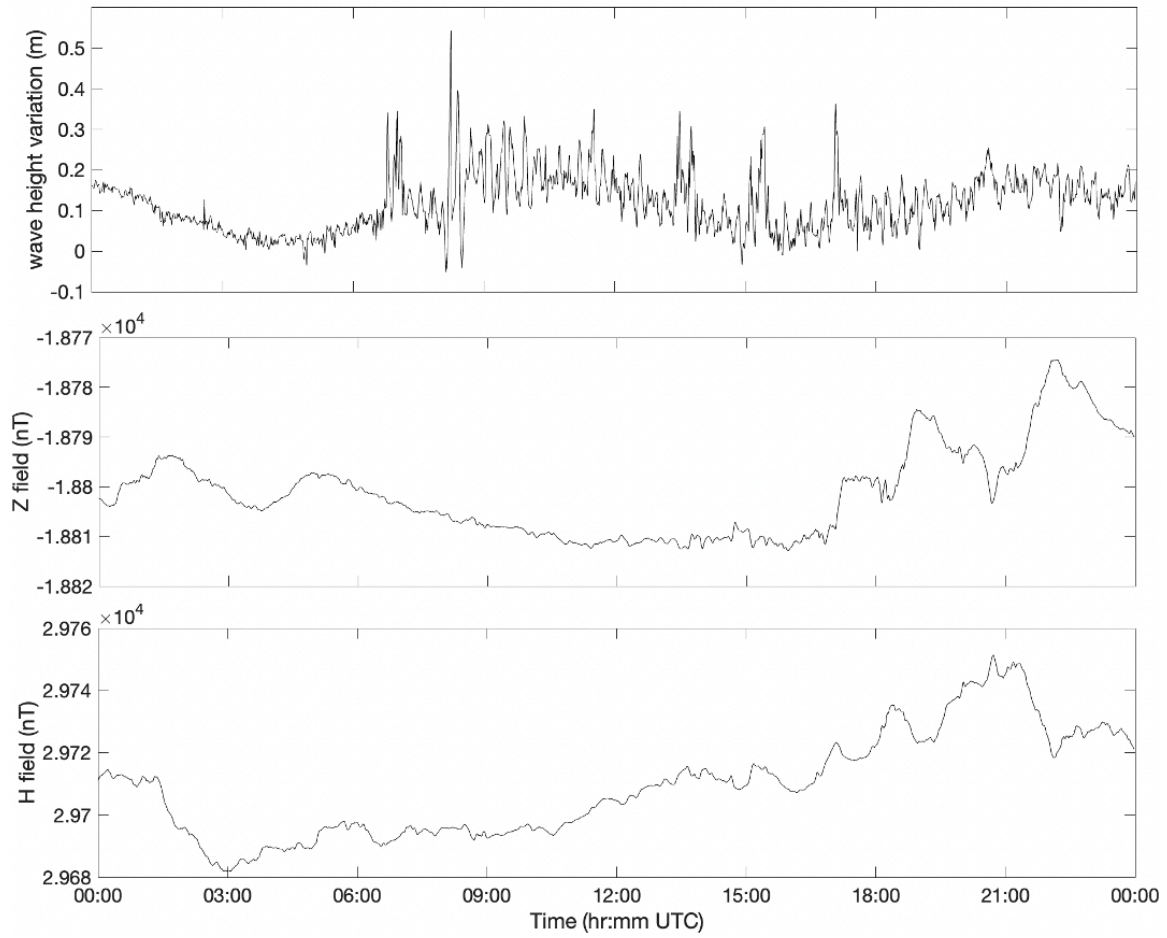
Figure S16. Raw water level variation and magnetic field data at Papeete, Tahiti, French Polynesia (PPT).

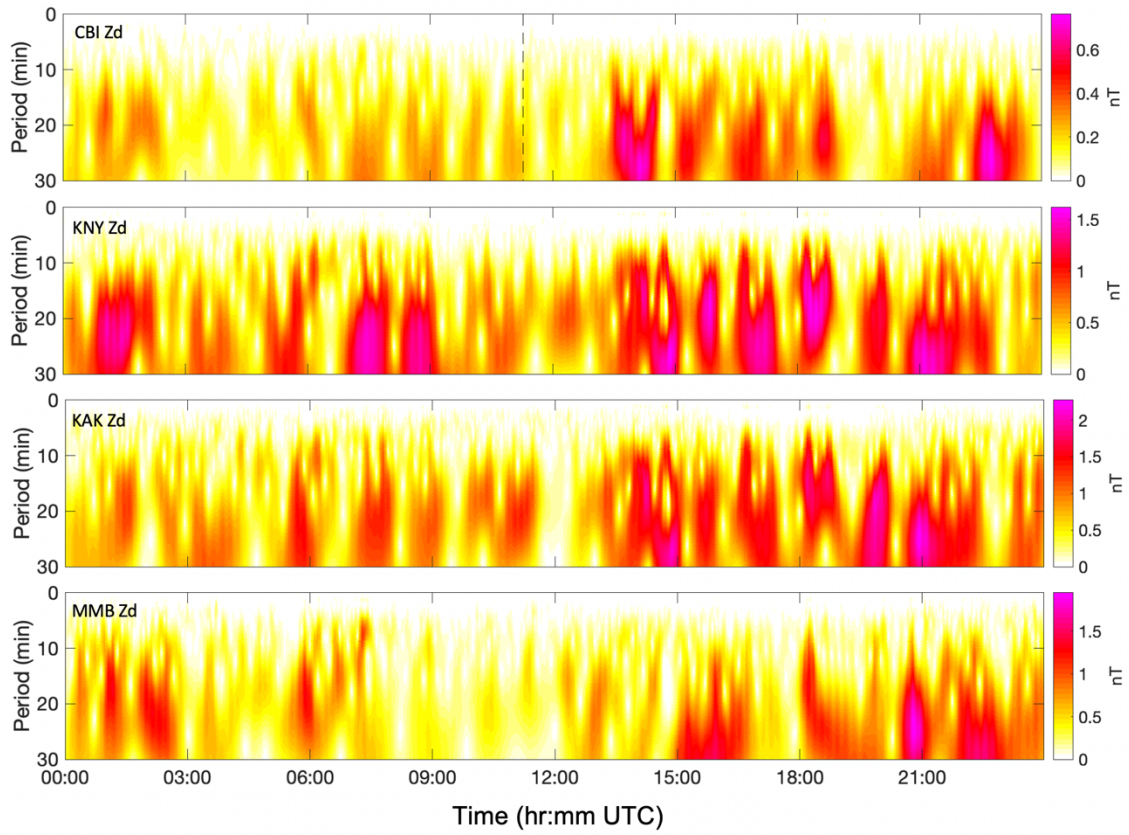# Cross-wavelet analysis spectrograms at Japanese observatories

Figure S17. The cross-wavelet analysis results using T_{max}= 30 minutes at the Japanese observatories. The dashed line in the top panel denotes the water wave arrival time at CBI.
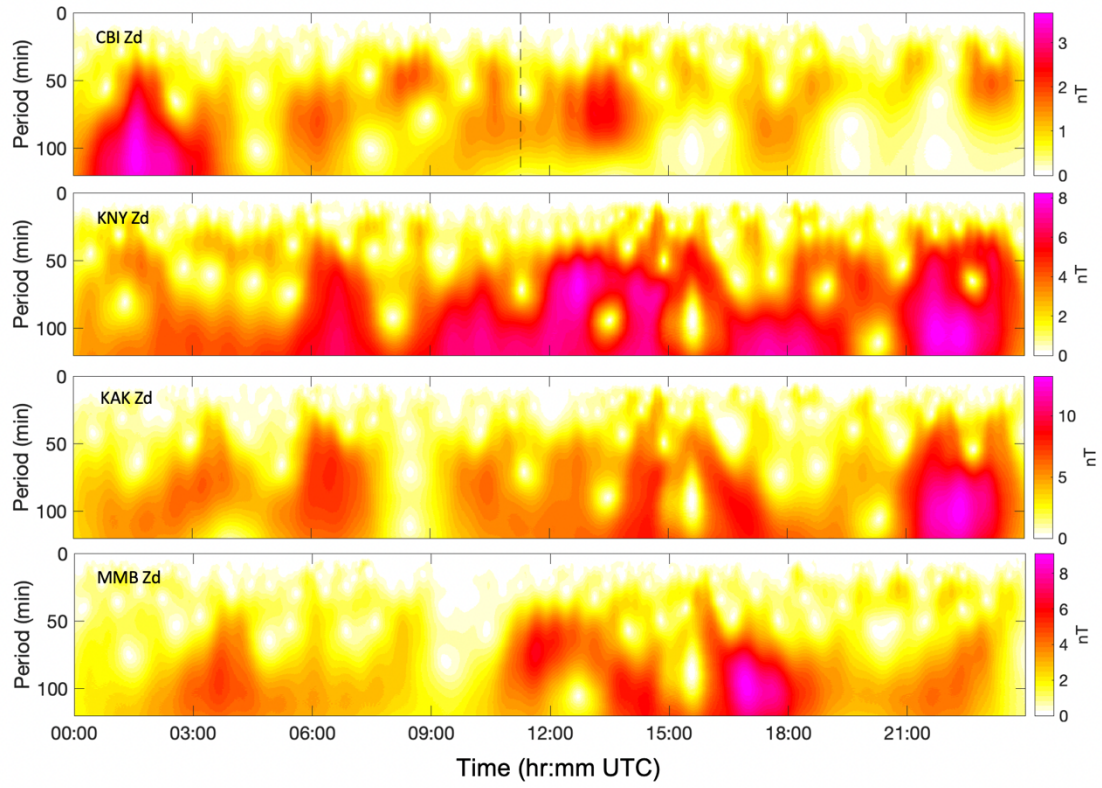
Figure S18. The cross-wavelet analysis results using T_{max}= 120 minutes the Japanese observatories. The dashed line in the top panel denotes the water wave arrival time at CBI.

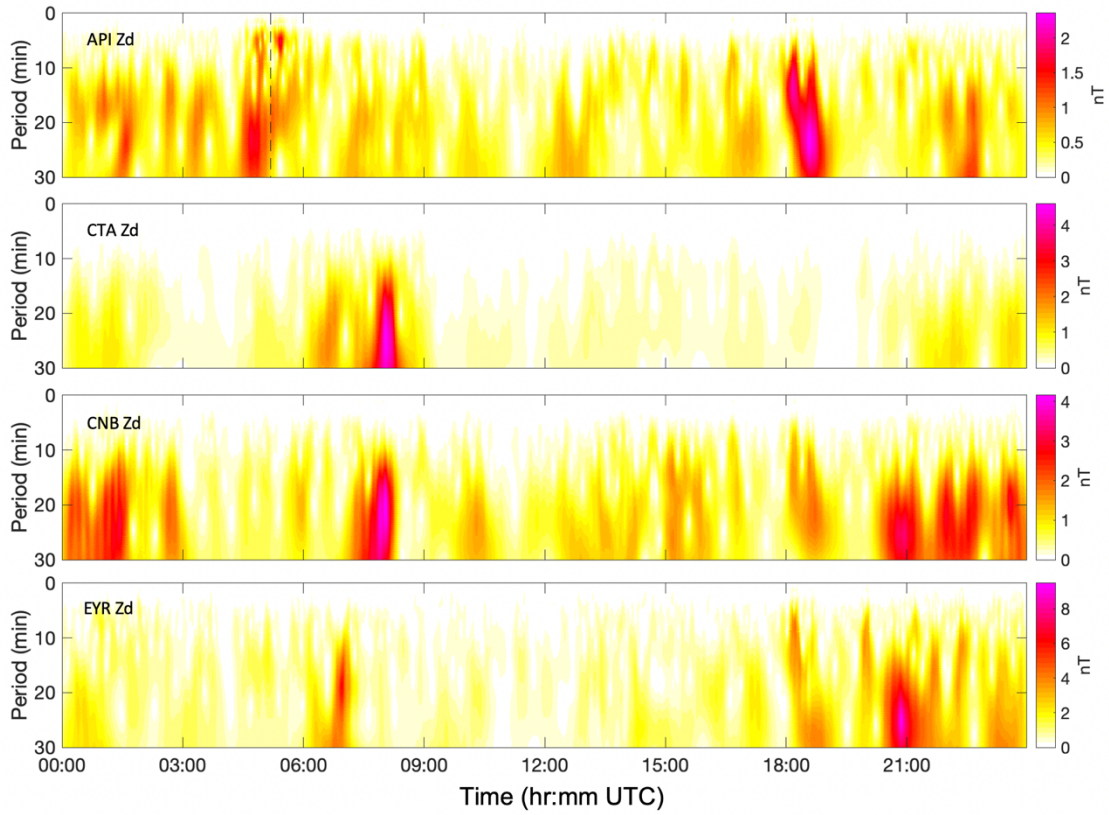# Cross-wavelet analysis spectrograms at Oceania observatories

Figure S19. The cross-wavelet analysis results using T_{max}= 30 minutes the Oceania observatories. The vertical dashed line denotes the Western Samoa (API) water wave arrival determined from the water level data.

Figure S20. The cross-wavelet analysis results using T_{max}= 120 minutes the Oceania observatories. The vertical dashed line denotes the Western Samoa (API) water wave arrival determined from the water level data.
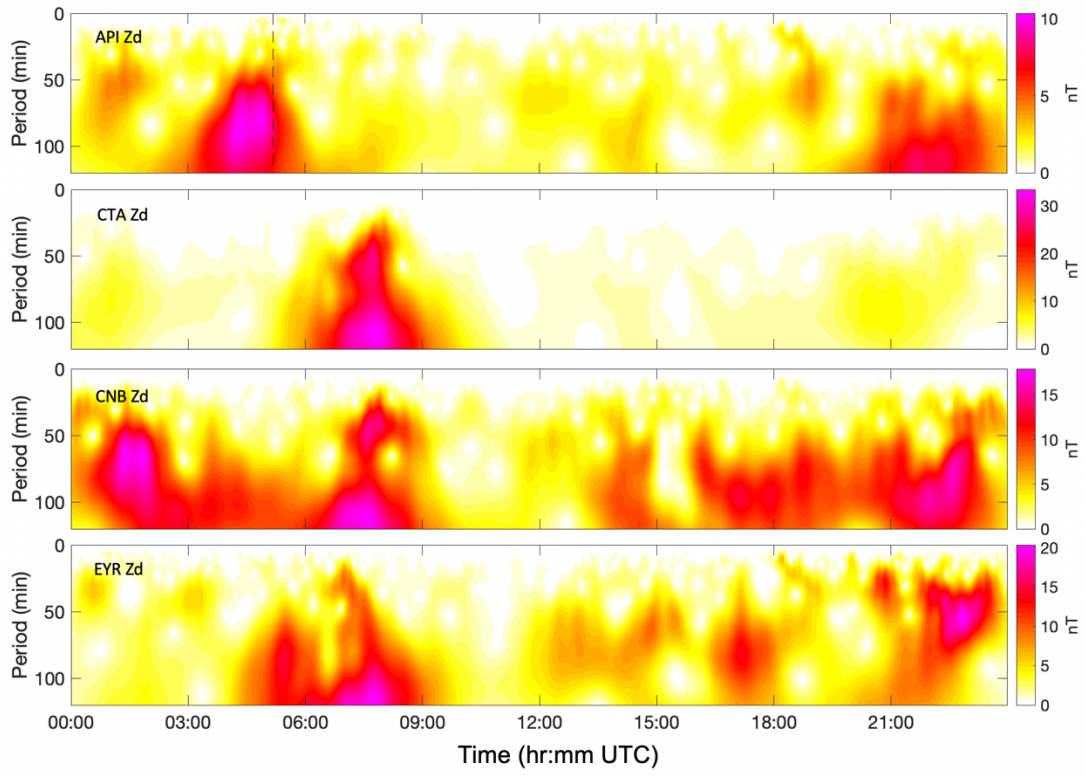
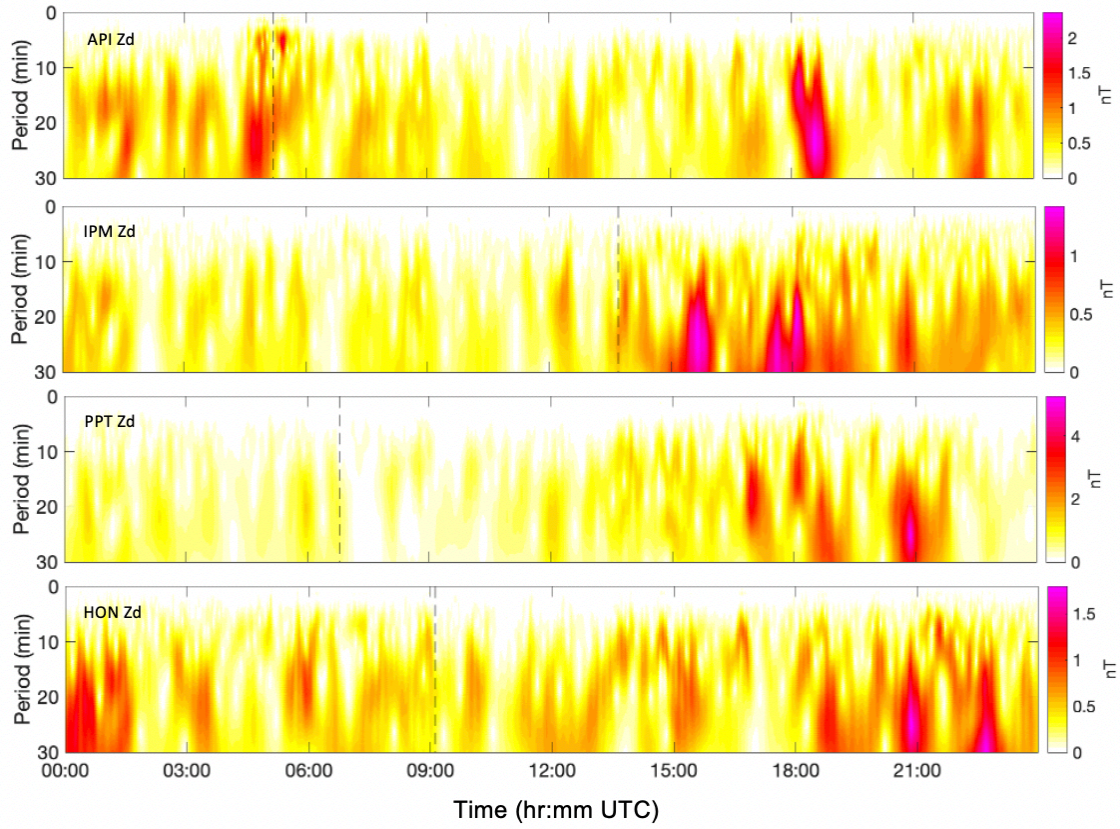# Cross-wavelet analysis spectrograms at mid-Pacific observatories

Figure S21. The cross-wavelet analysis results using T$_{max}$= 30 minutes the mid-Pacific observatories. The vertical dashed line denotes the water wave arrival determined from the water level data.
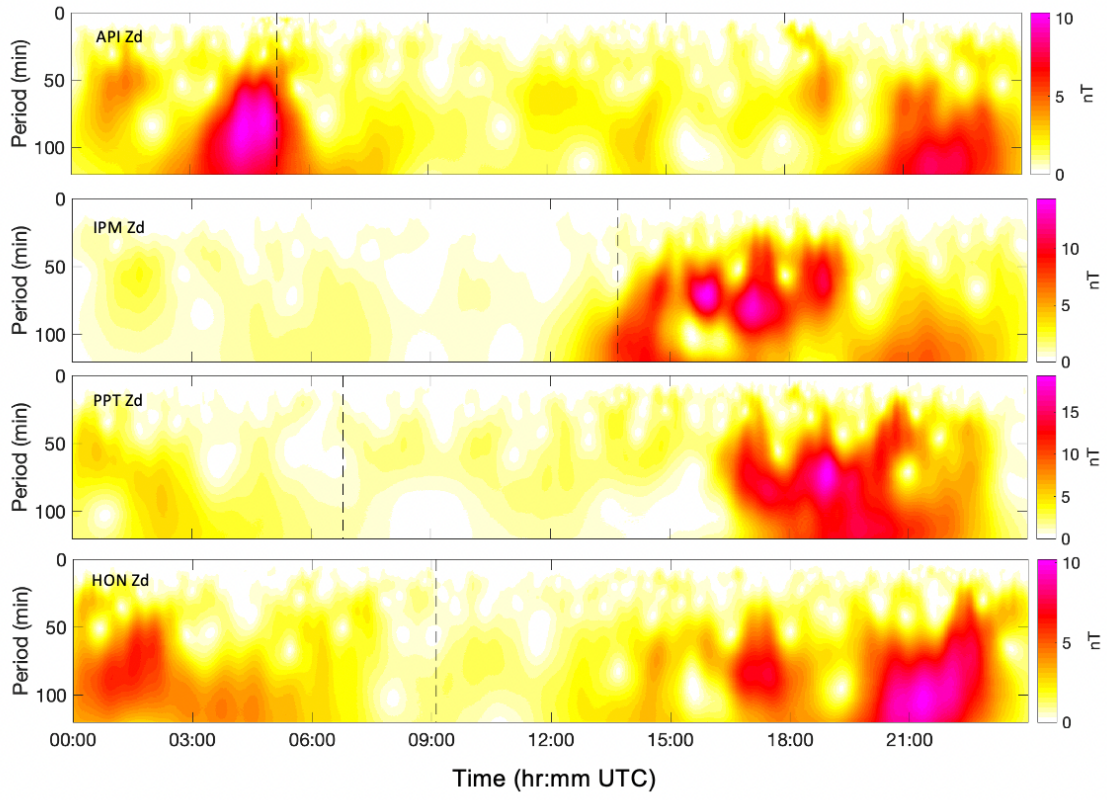
Figure S22. The cross-wavelet analysis results using T_{max}= 120 minutes the mid-Pacific observatories. The vertical dashed line denotes the water wave arrival determined from the water level data.
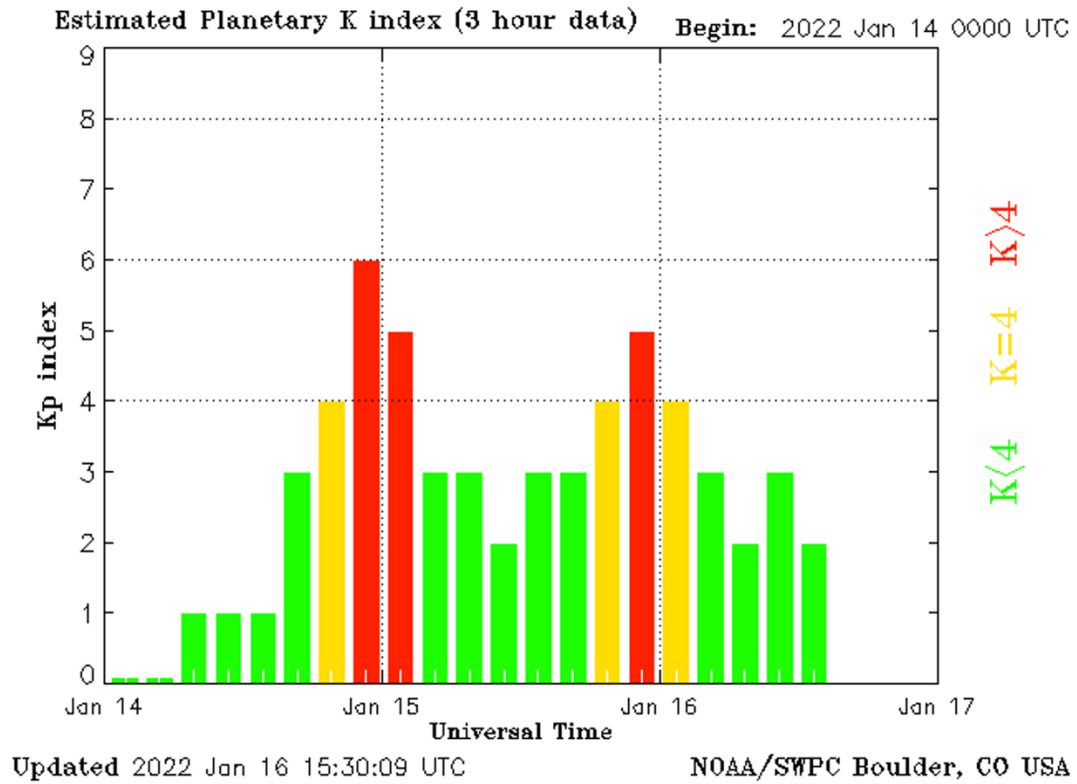
Geomagnetic conditions

Figure S23. The Kp index on January 14-16, 2022**.**