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National Report of Greece

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EUREF 2023 SYMPOSIUM
GOTHENBURG 23 - 26 May 2023

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Outline

1. **Study of post-seismic deformations related to the 2014 North Aegean Sea earthquake**
2. **Monitoring of ionospheric activity**

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Study of post-seismic deformations

Motivation

Station coordinates and velocities are crucial for maintaining national RTK networks and reference frames.

Usually, station velocities are linear.

Any non-linearities (caused e.g. by earthquakes) should be identified and estimated.

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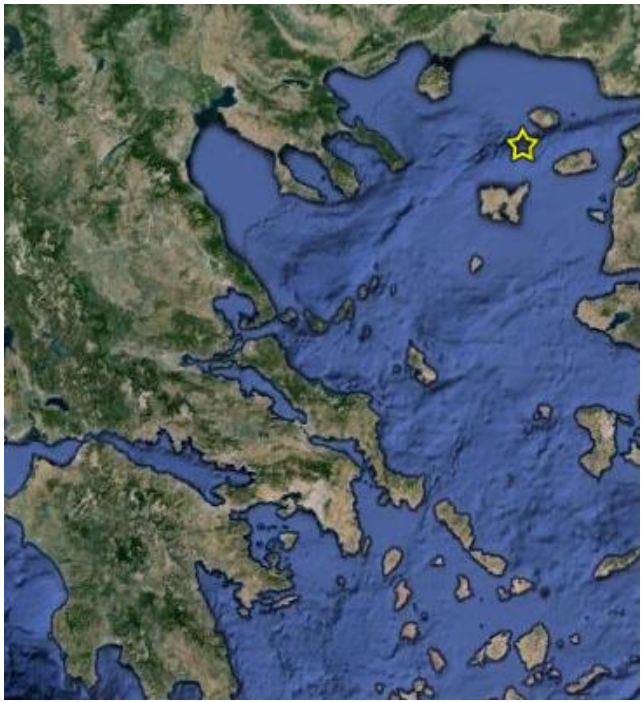
Study of post-seismic deformations

The 2014 North Aegean Sea earthquake



Day: May 24, 2014
Mw: 6.9
Depth: 28 Km

Stroke along the North Aegean Trough, near Samothrace Island.

Significant permanent displacements.

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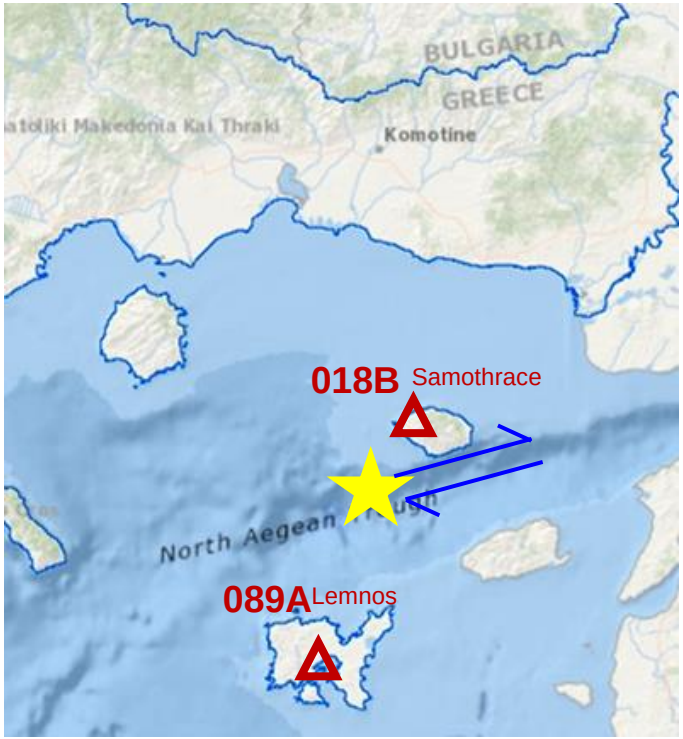
Study of post-seismic deformations

Data processing



Daily RINEX files from HEPOS stations:

- 018B in Samothrace

- 089A in Lemnos

Data span: 2010 - 2020

Processing method: PPP

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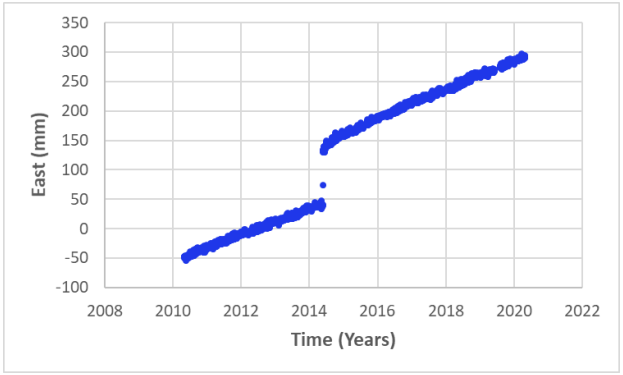
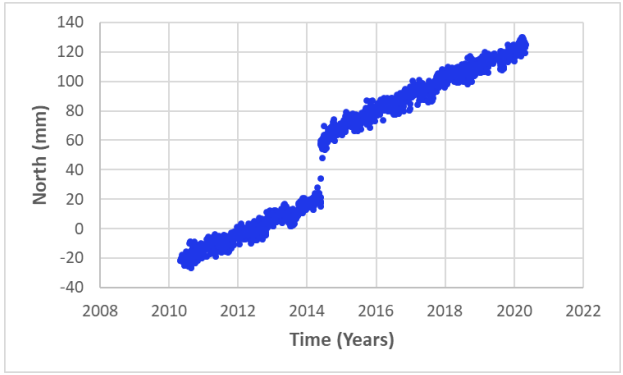
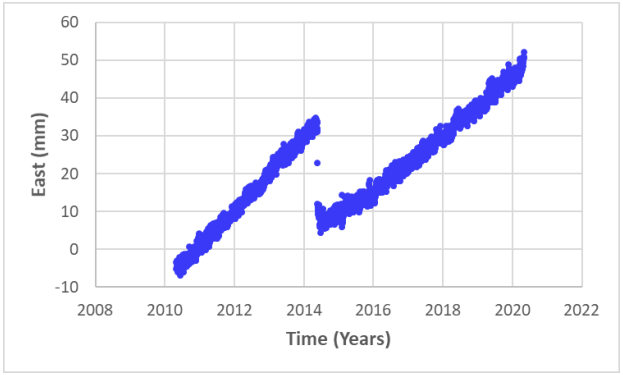
Study of post-seismic deformations

Coordinate time-series

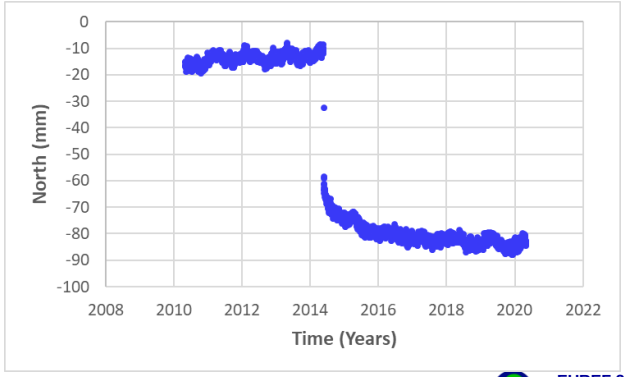


Samothrace





Lemnos



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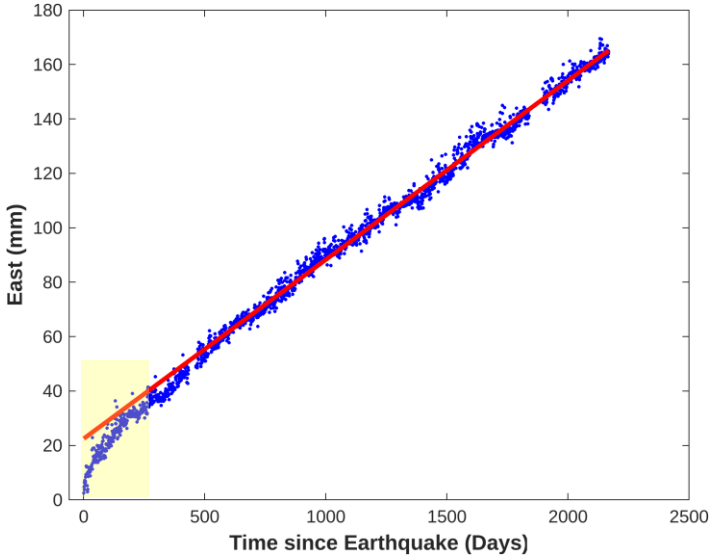
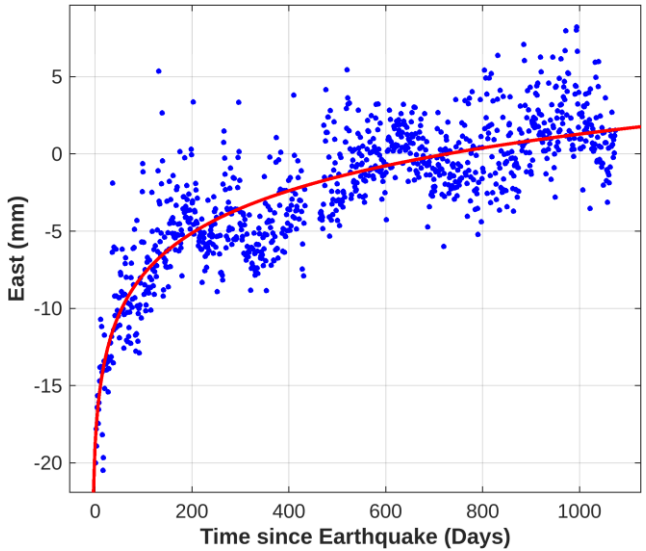
Study of post-seismic deformations

Estimation of PSD





Samothrace East

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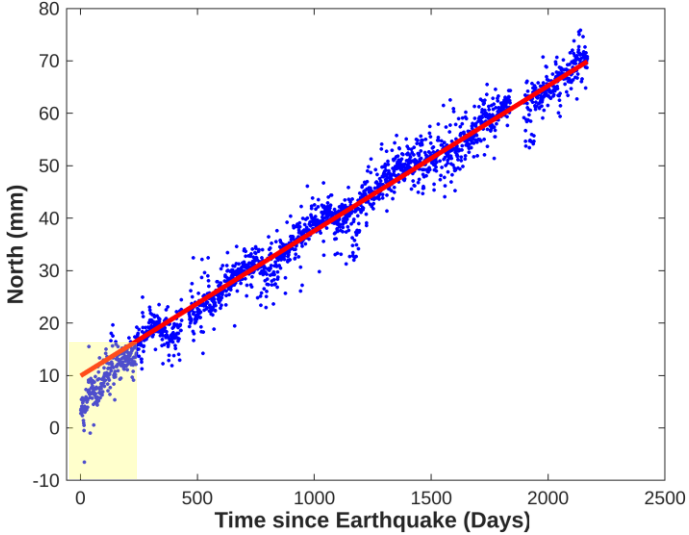
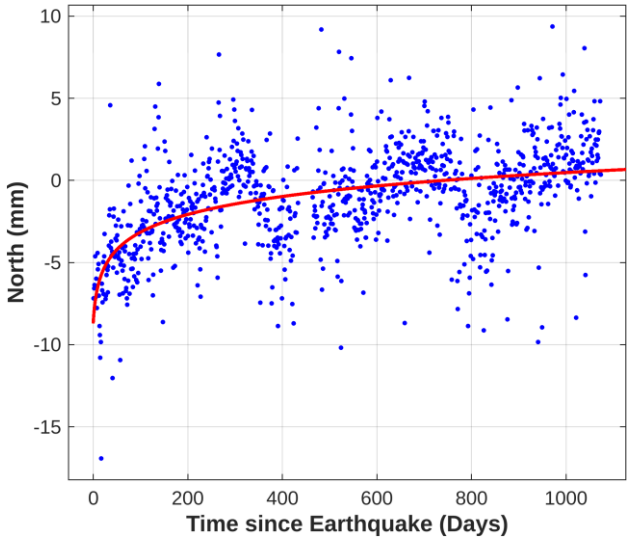
Study of post-seismic deformations

Estimation of PSD





Samothrace North

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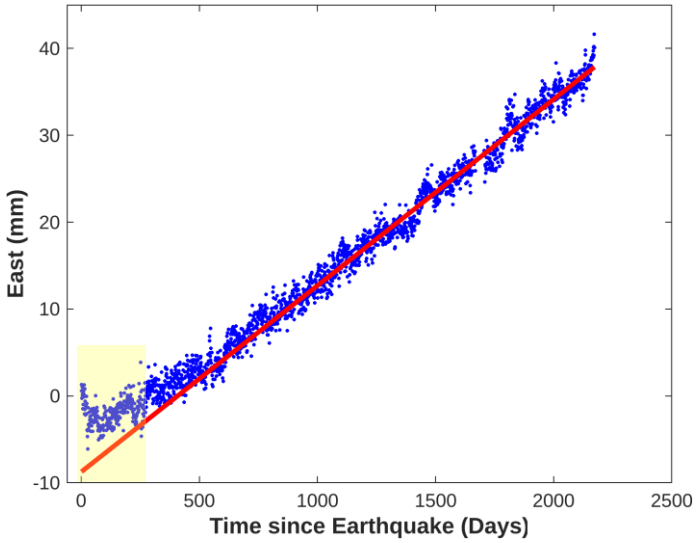
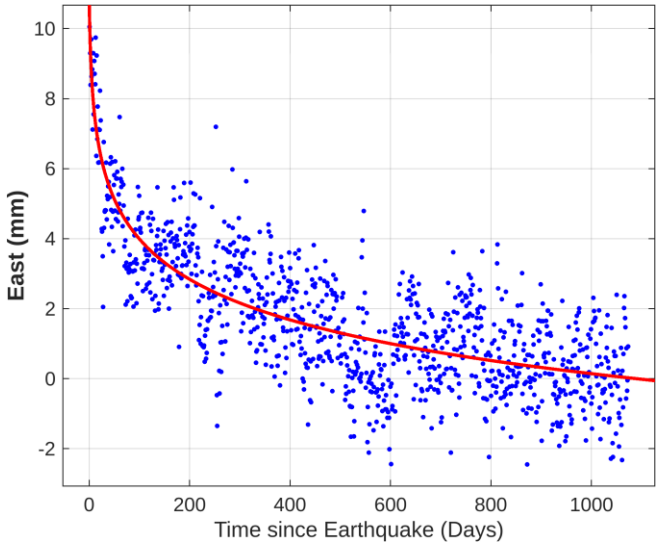
Study of post-seismic deformations

Estimation of PSD





Lemnos East

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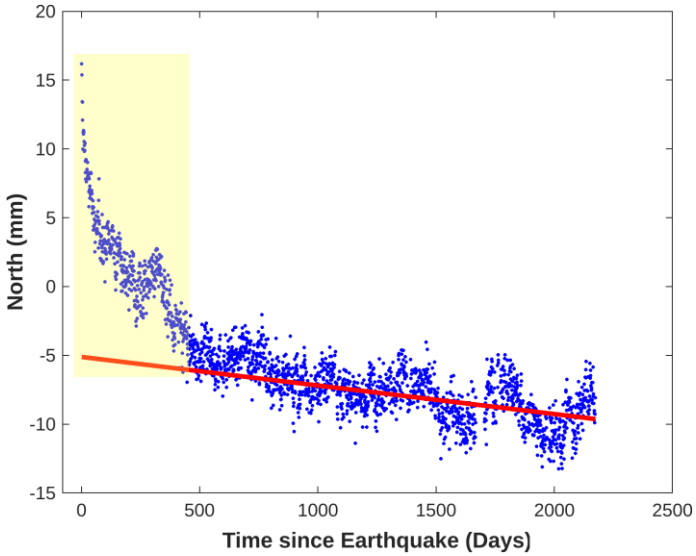
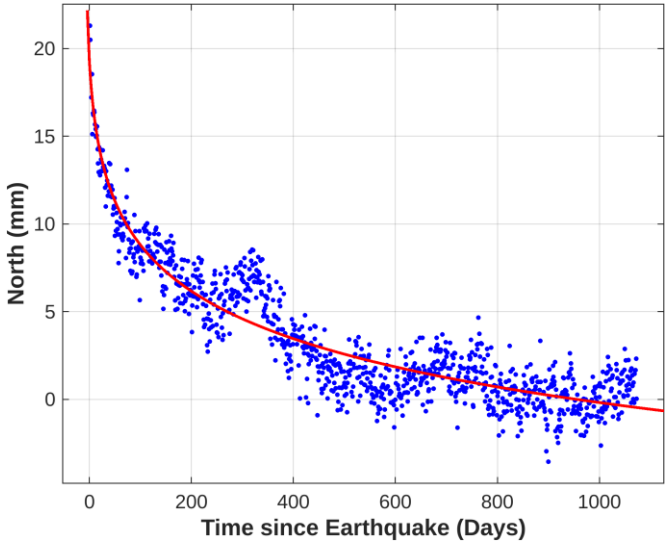
Study of post-seismic deformations

Estimation of PSD





Lemnos North

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Study of post-seismic deformations

Post-seismic vs. co-seismic deformations

Post-seismic vectors are aligned to co-seismic ones.

Ratio post-seismic / co-seismic	
Station	**Ratio**
Samothrace	~20%
Lemnos	~40%

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Monitoring of ionospheric activity

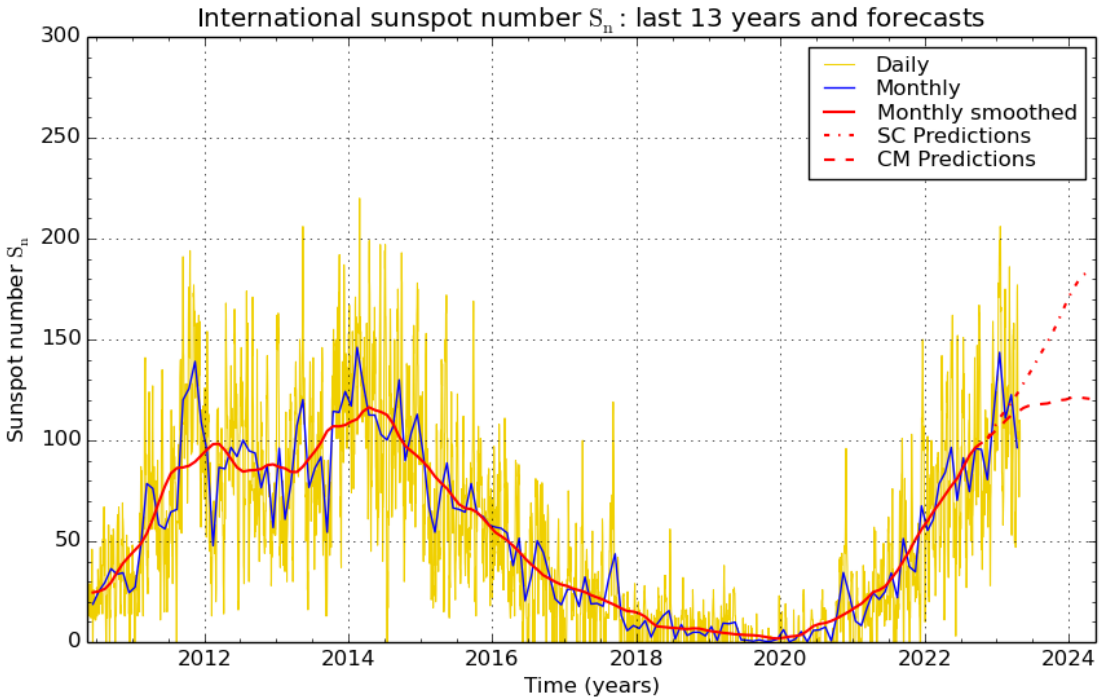
Motivation

During the maximum of the 24th Solar Cycle (~2012-2013) intense ionospheric activity seriously affected RTK applications in Greece, mainly in the Southern part of the country.

As the maximum of the 25th Solar Cycle is approaching, in HEPOS we monitor the ionospheric activity over Greece.

Monitoring of ionospheric activity

Sunspot number



SILSO graphics (http://sidc.be/silso) Royal Observatory of Belgium 2023 May 1

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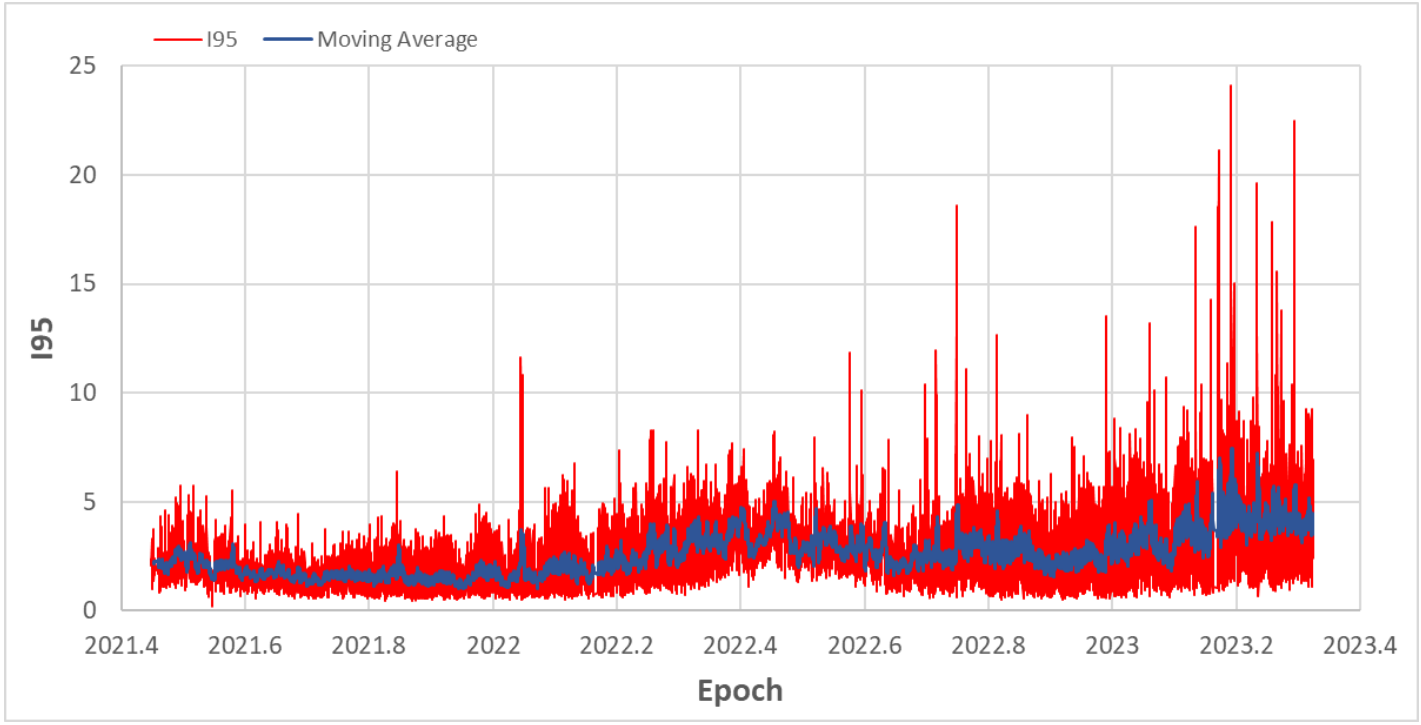
Monitoring of ionospheric activity

HEPOS I95 index - Mainland & Islands



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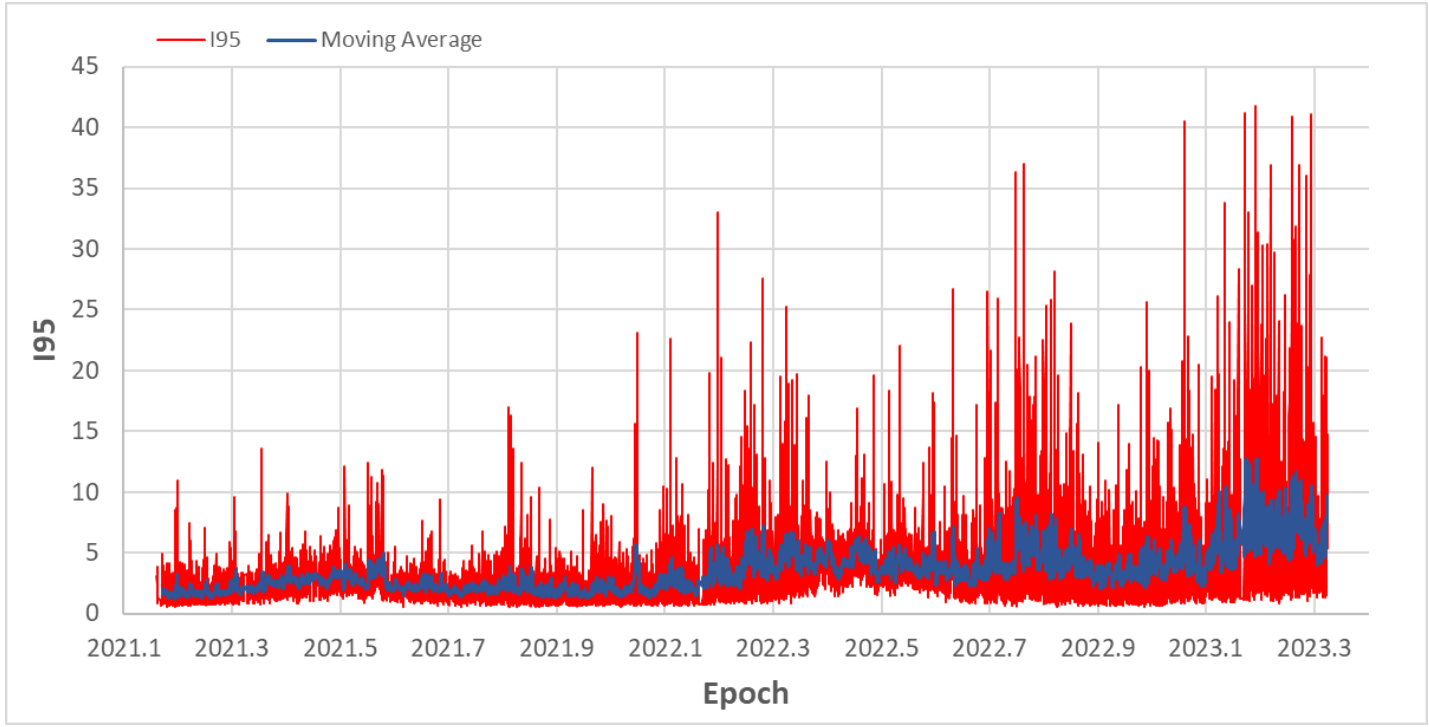
Monitoring of ionospheric activity

HEPOS I95 index - Crete



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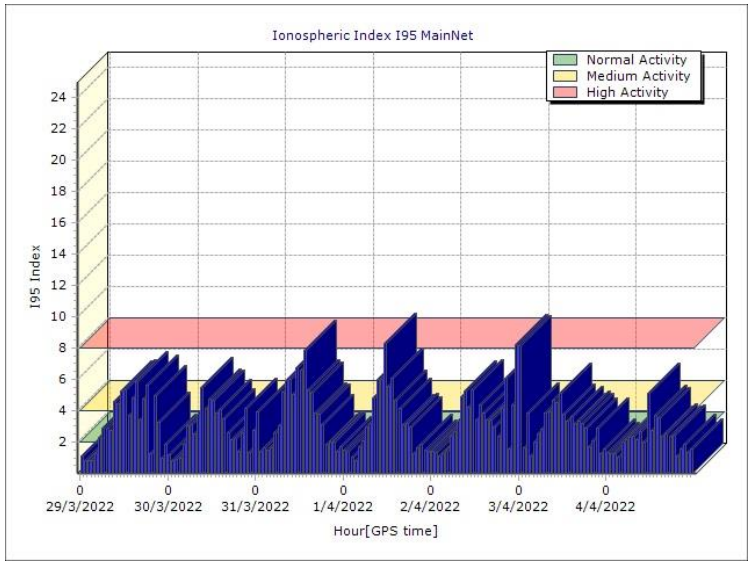
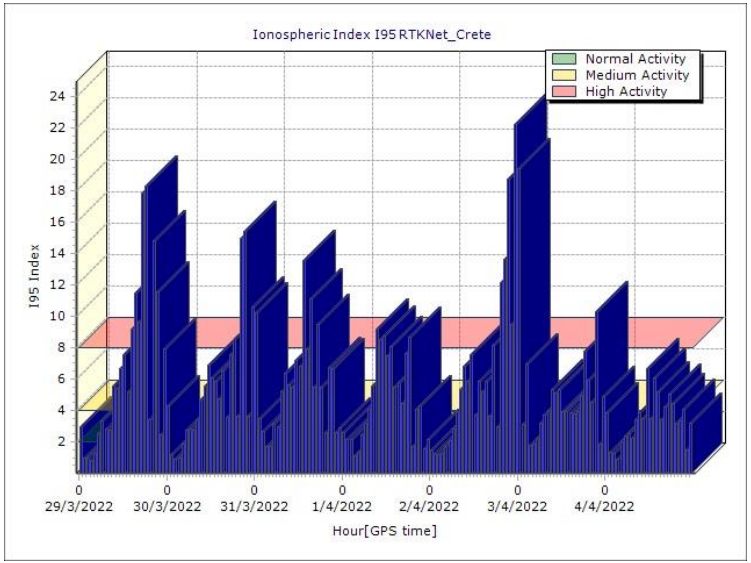
Monitoring of ionospheric activity

HEPOS I95 index – March 2022

Mainland & Islands



Crete



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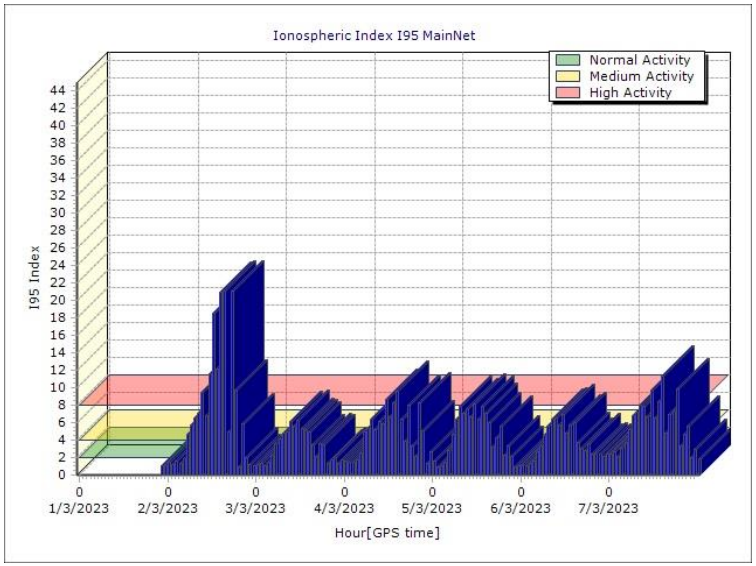
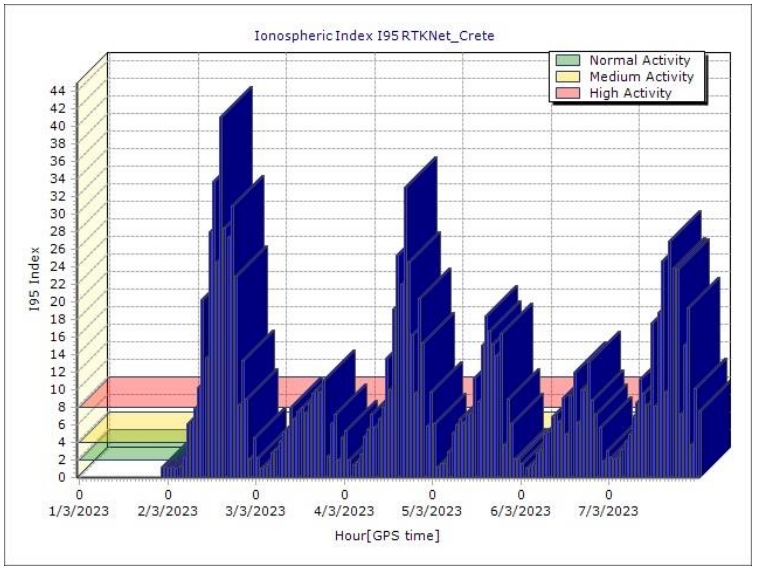
Monitoring of ionospheric activity

HEPOS I95 index – March 2023

Mainland & Islands



Crete



As we are approaching the max of the 25th Solar Cycle,
I95 is increasing over Greece and particularly over Crete.

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Acknowledgments

Thank you for your attention!

HEPOS
HEllenic POsitioning System

The establishment of HEPOS was part of the Operational Program “Information Society” and was co-funded by the European Regional Development Fund.