
Seismicity and tectonics in central Ionian Islands and radon emission measurements

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PREPARATORY COMMISSION

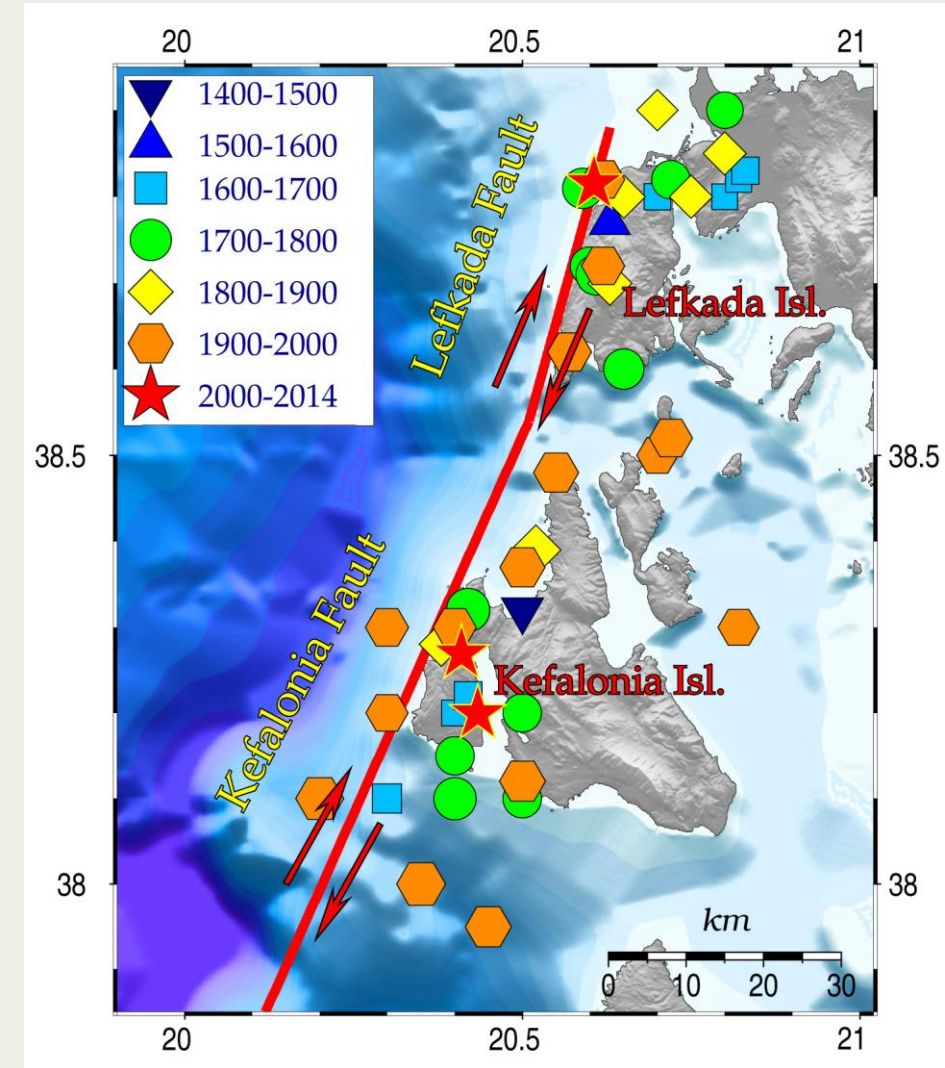
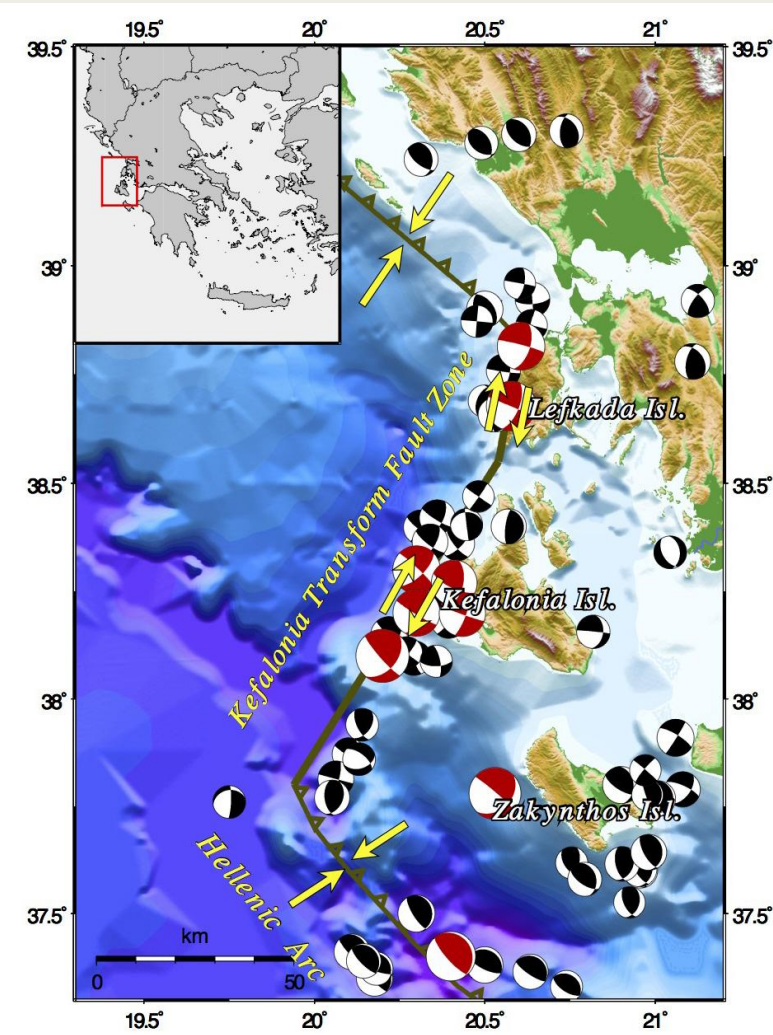
PUTTING AN
END TO NUCLEAR
EXPLOSIONS

Presentation Date: dd September 2025

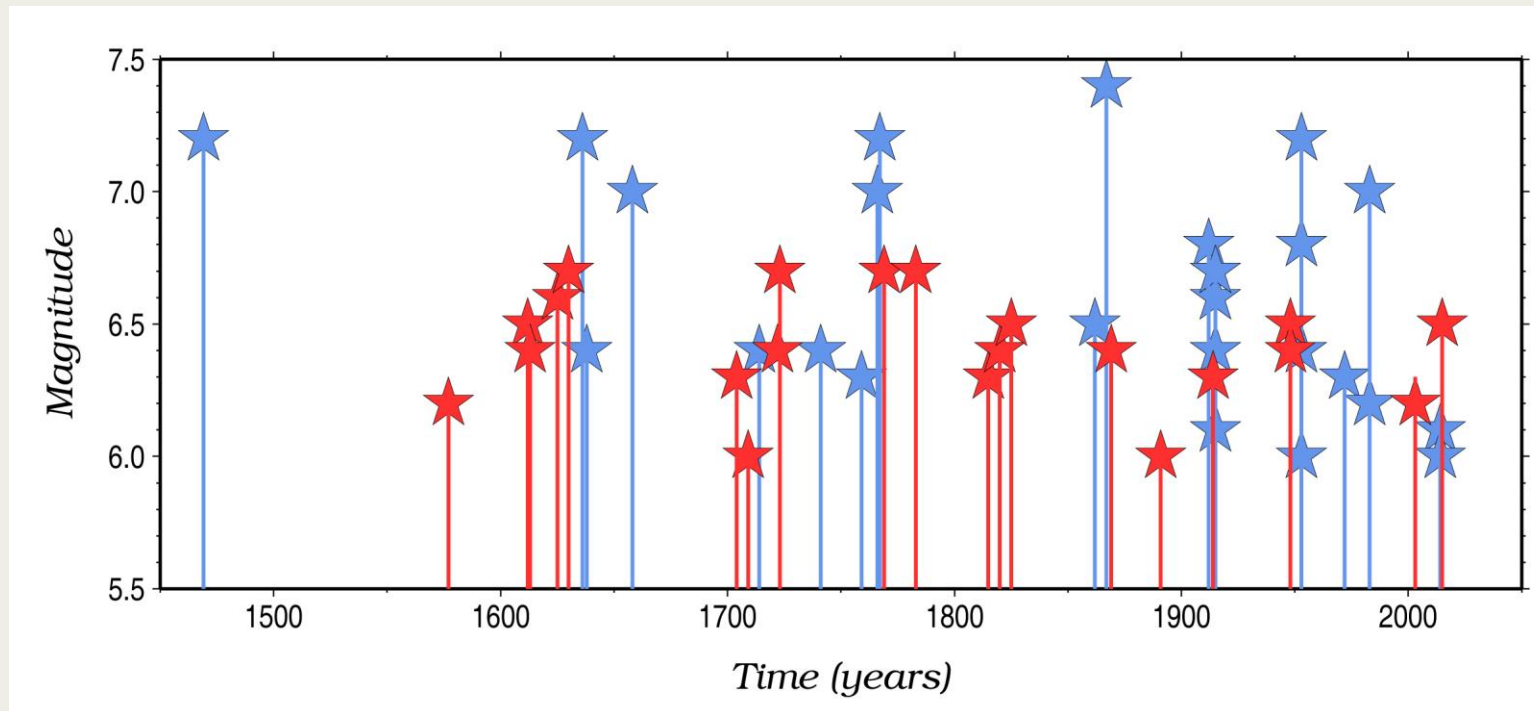
Geodynamics & Seismicity

The main geodynamic characteristics of the area of central Ionian Islands

Locations of historical earthquakes with $M \geq 6.0$ that occurred in Lefkada and Kefalonia Islands since the 15th century



Temporal behavior of strong ($M > 6.0$) earthquake activity

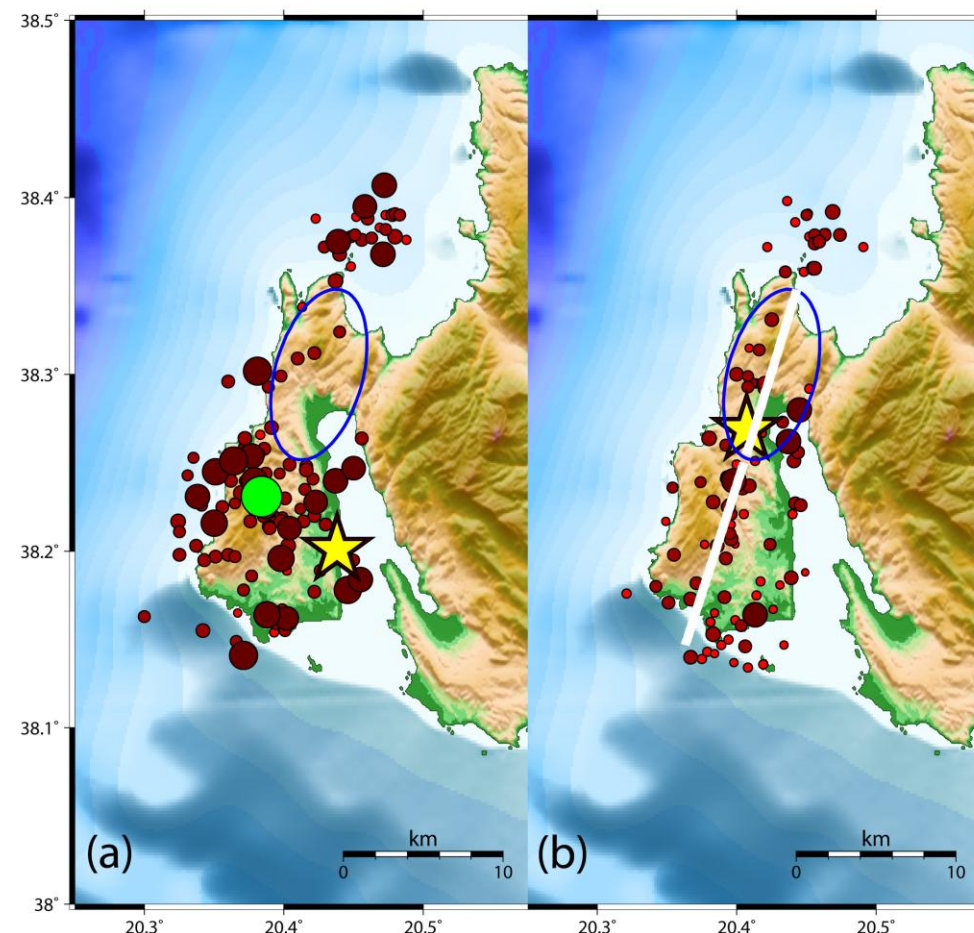
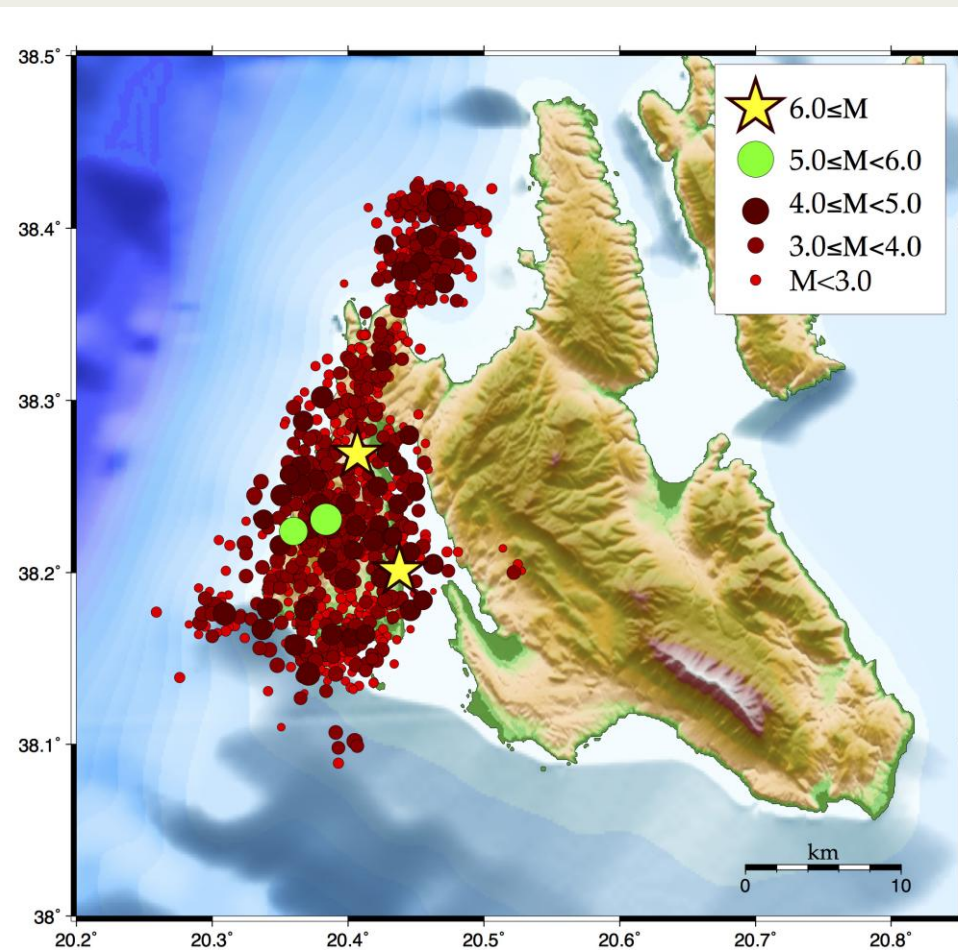


Temporal behavior of strong ($M > 6.0$) earthquake activity in central Ionian Islands (lines and stars, red for Lefkada and blue for Kefalonia fault branch, respectively)

Relocated aftershock activity of the 2014 Kefalonia doublet (M6.1 & Mw6.0)

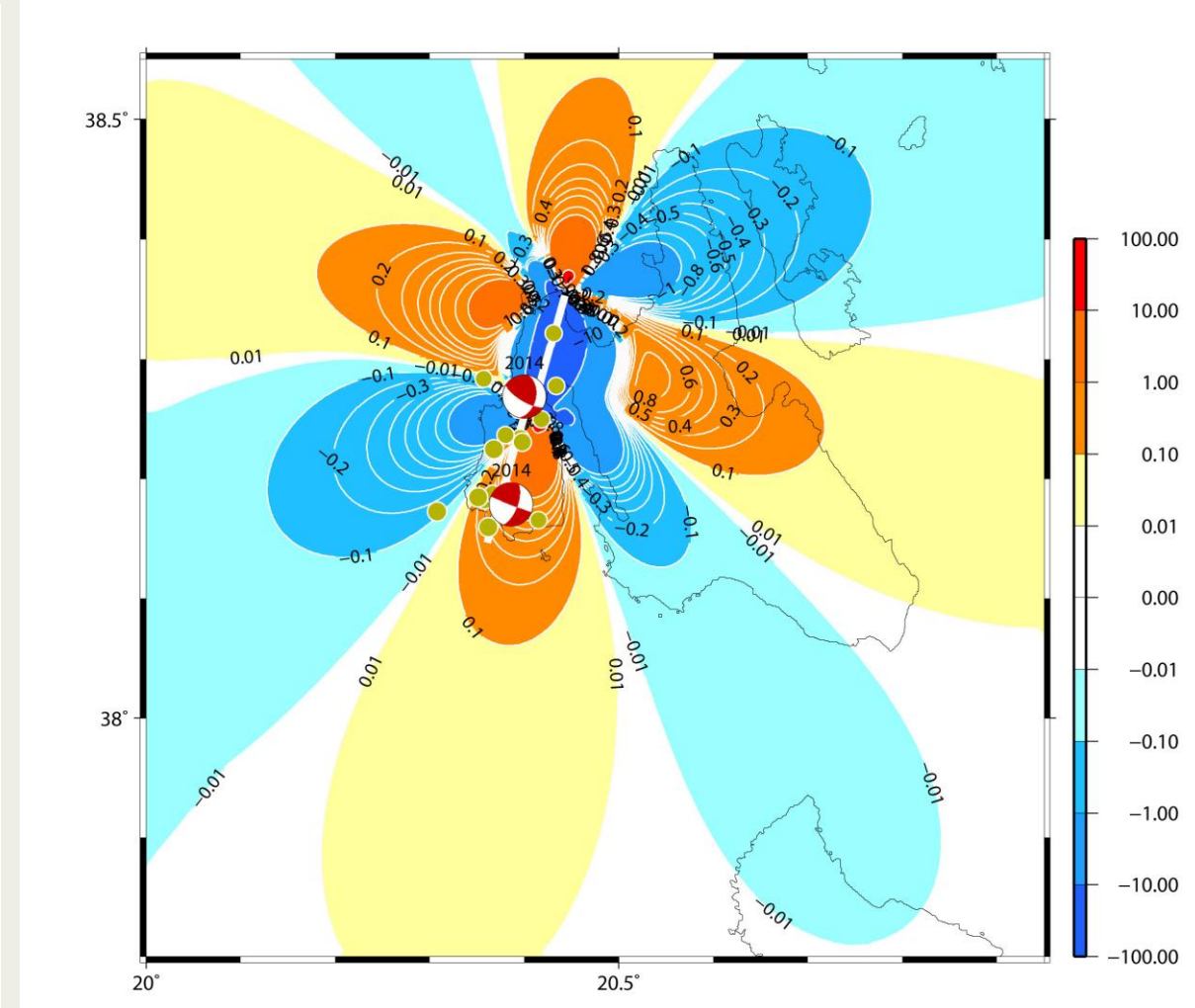
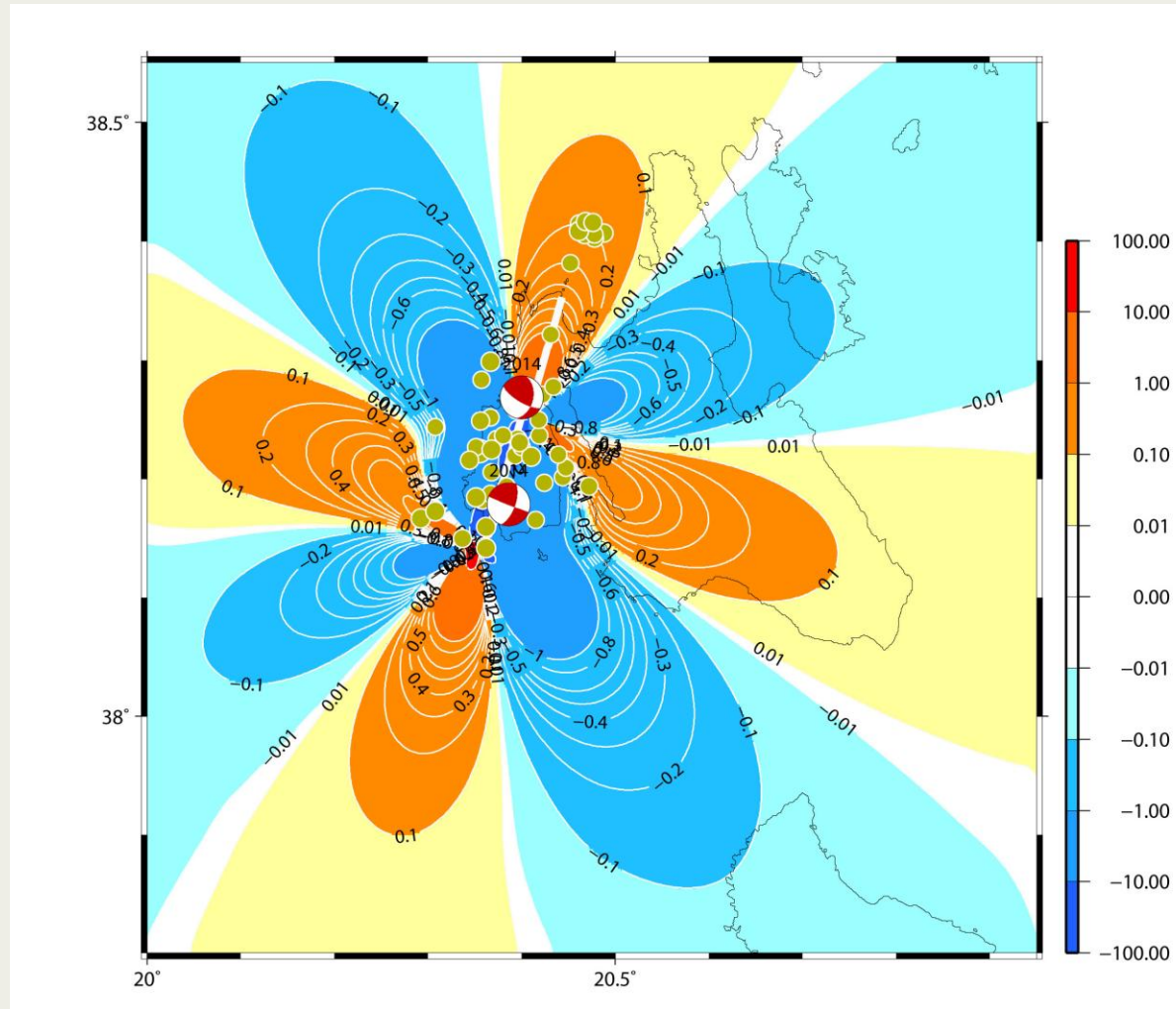
During the first 22 days of the sequence (26 January – 16 February 2014)

(a) Aftershock activity for one day after the occurrence of the 26 January 2014 main shock and (b) one day after the 3 February 2014 main shock.



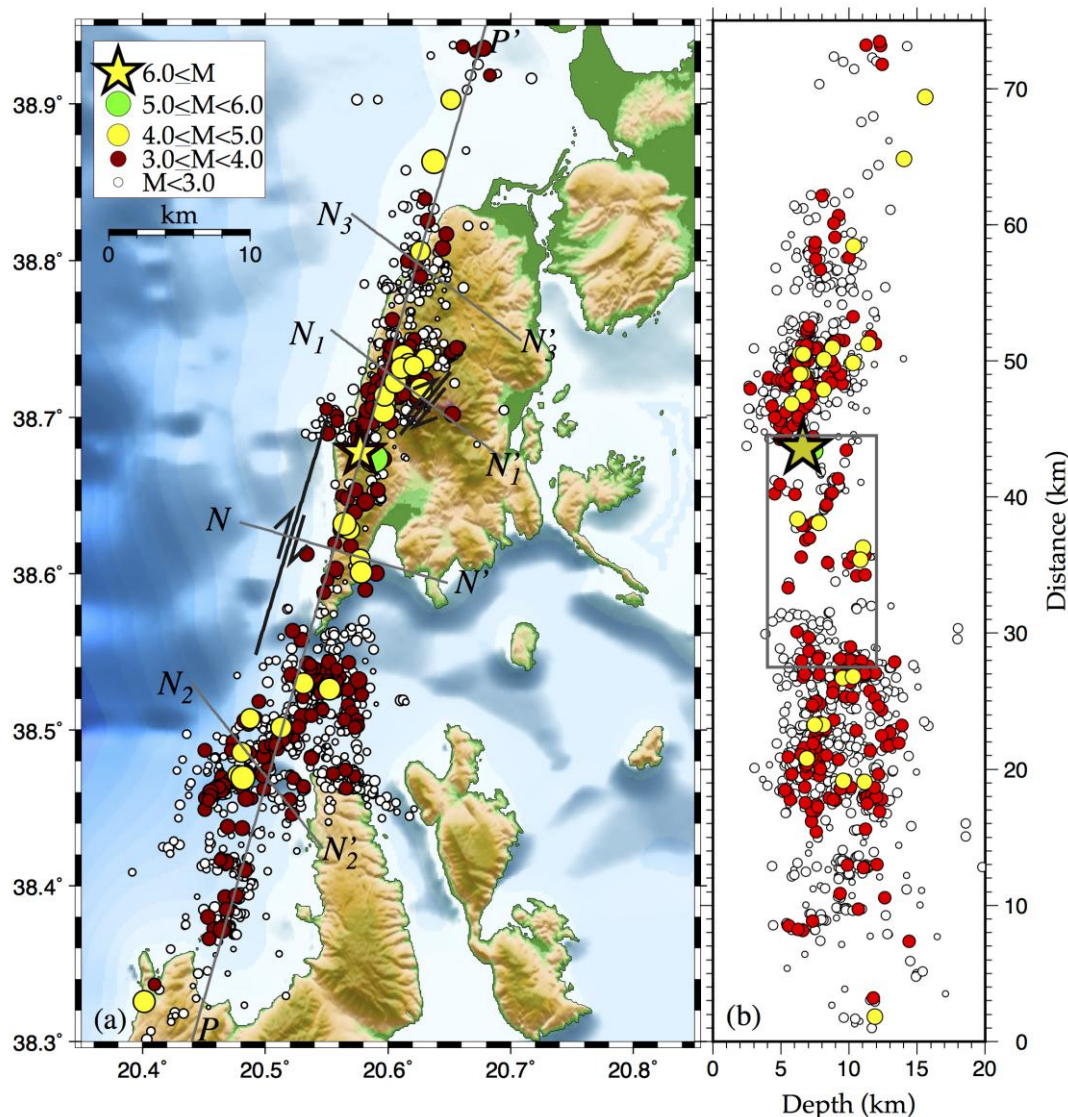
Coulomb stress changes due to the coseismic slip of the (a) 26 January and (b) 3 February 2014 main shocks

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DISCLAIMER (if any) [Arial Regular/ Font Size 8]

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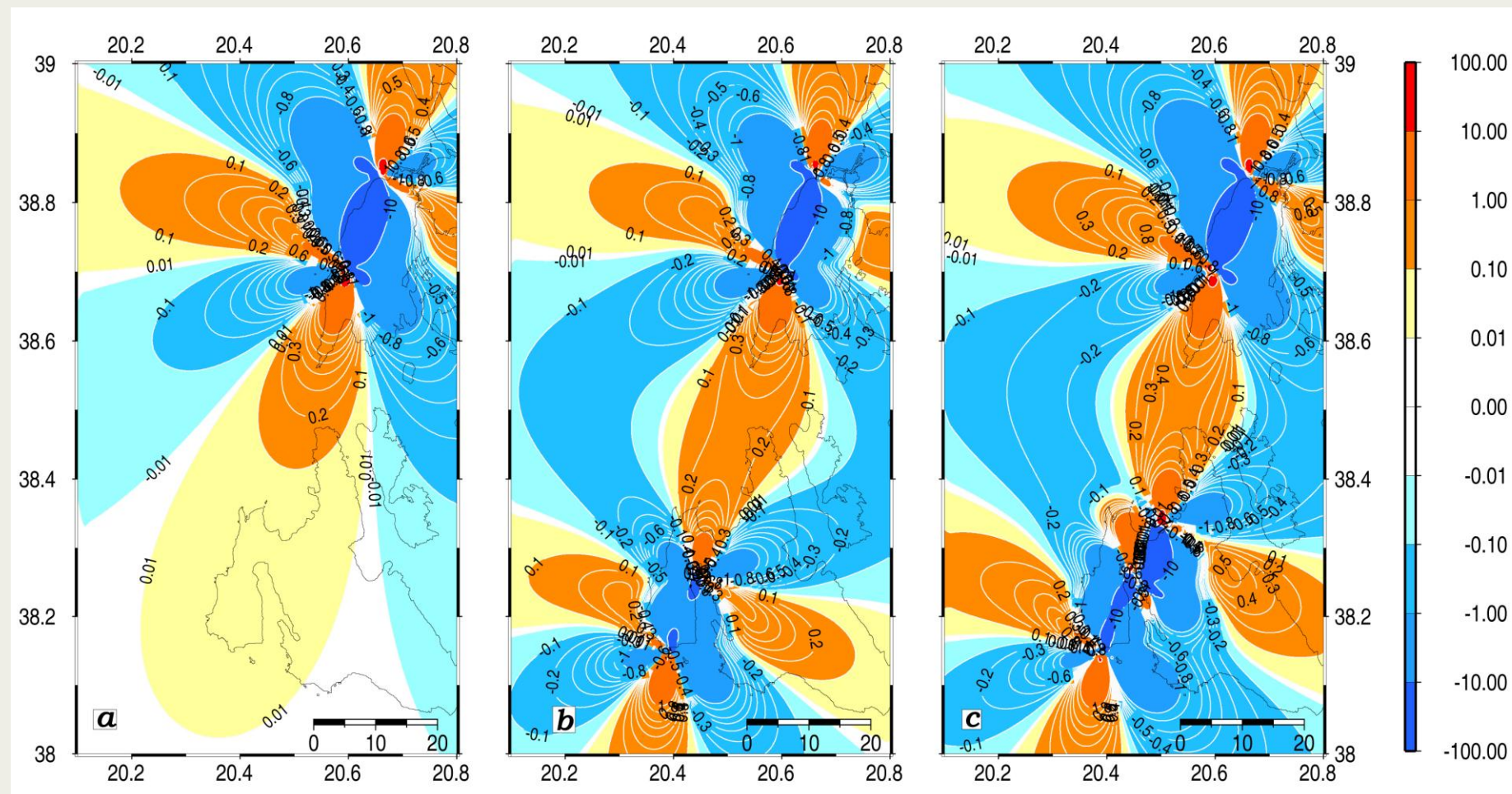


Aftershock Sequence of the 2015 Mw6.5 Lefkada Main Shock

(a) Map view of the relocated seismicity. The thick solid line shows the main rupture extent with the antiparallel arrows emphasizing the dextral slip motion. The line PP' shows the position of the strike parallel vertical cross section (whereas the NN', N1N1', N2N2', N3N3', of the normal ones that are not shown here). The main shock epicenter is depicted by a star, (b) Strike parallel cross section along the line PP'. The main rupture area is enclosed by the rectangle.

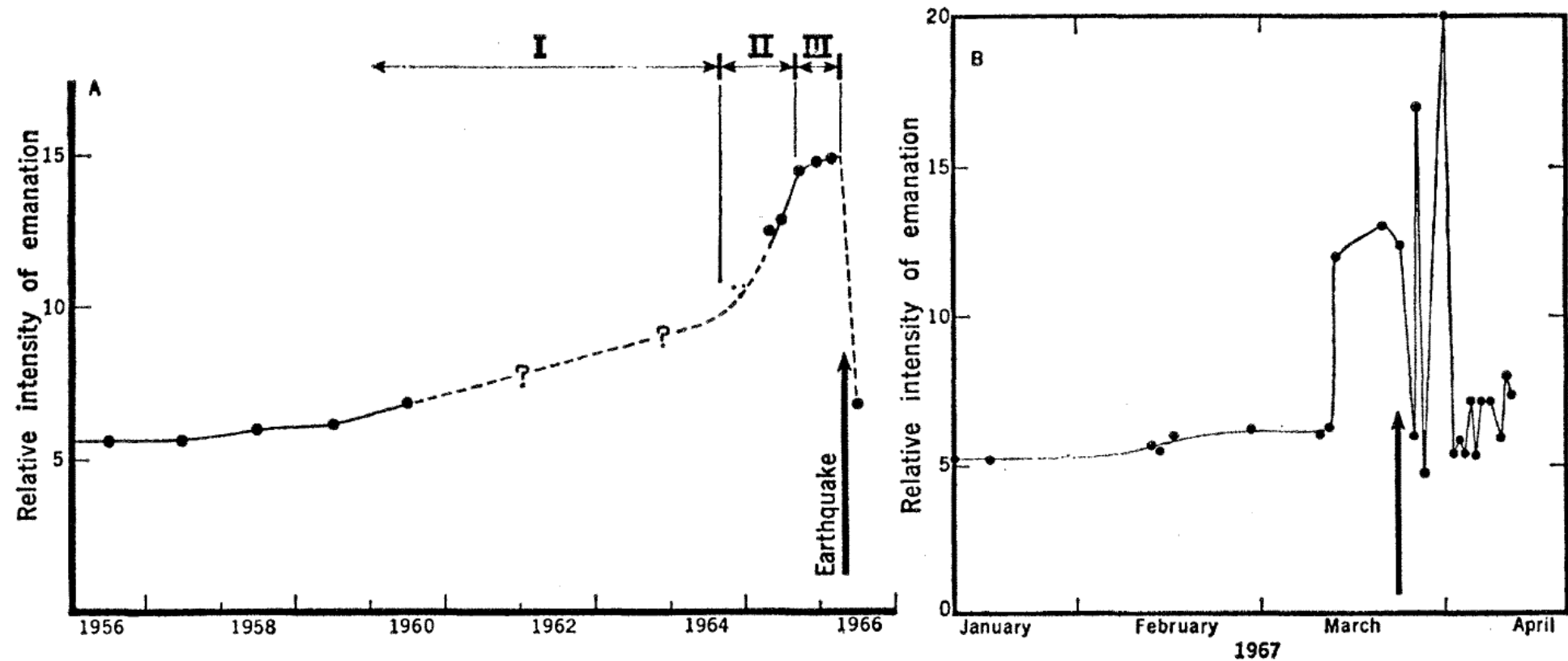
Coulomb stress changes due to the coseismic slips of the $M \geq 6.0$ main shocks

Changes are calculated at a depth of 8 km, according to the scale of the top (in bars) and by the numbers in the contour lines. The stress field is calculated according to the faulting type of the 2015 main shock and is due to the coseismic slip of (a) the 2003 main shock, (b) the 2003 and the first 2014 main shock, and (c) the 2003 and both 2014 main shocks.

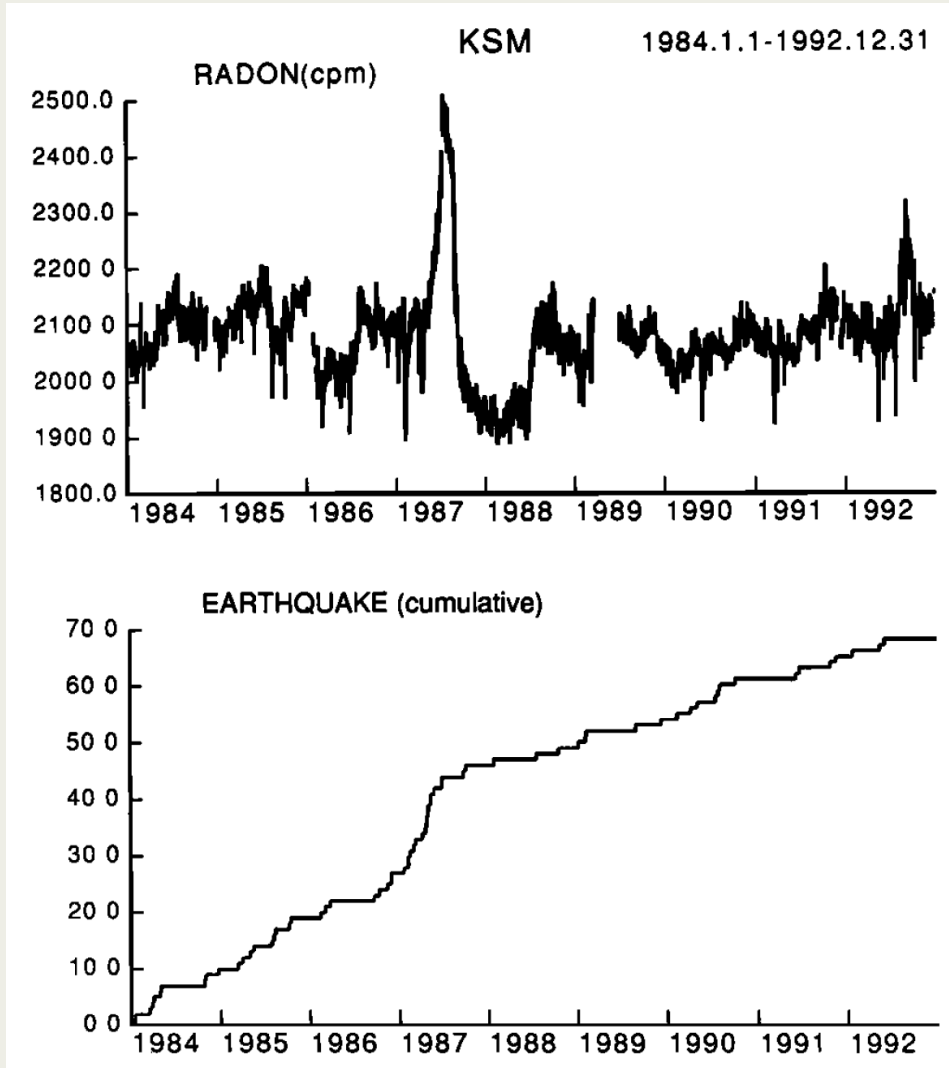
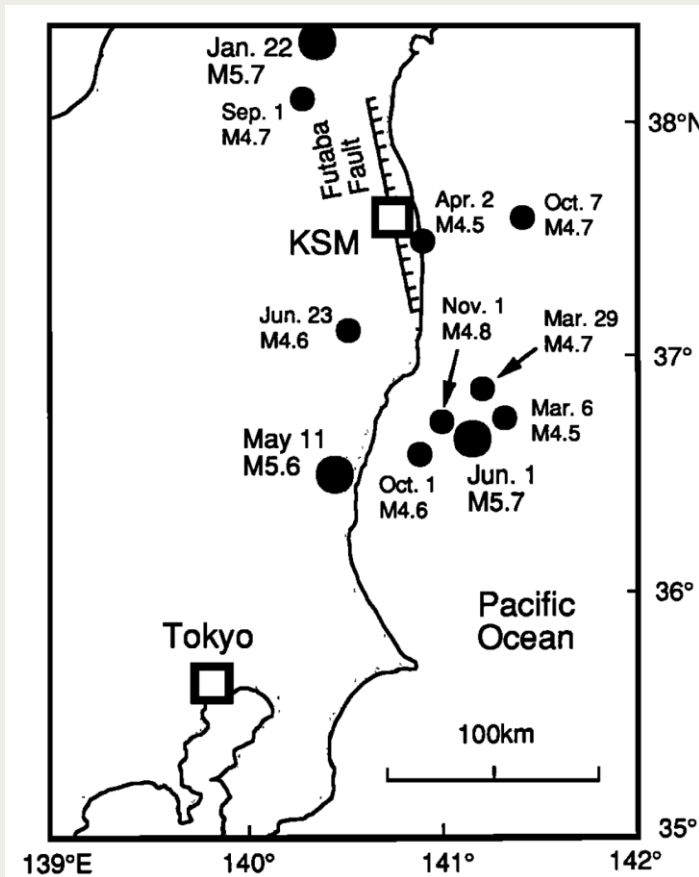


Radon emission as an earthquake precursor

Radon emission counts from a deep well in the hypocentral zone of (a) the 1966 Tashkent earthquake ($M=5.3$) and (b) an aftershock at Tashkent ($M=4.0$). Arrows denote the origin times of the shocks (from Scholz et al., 1973)



Radon emission as an earthquake precursor

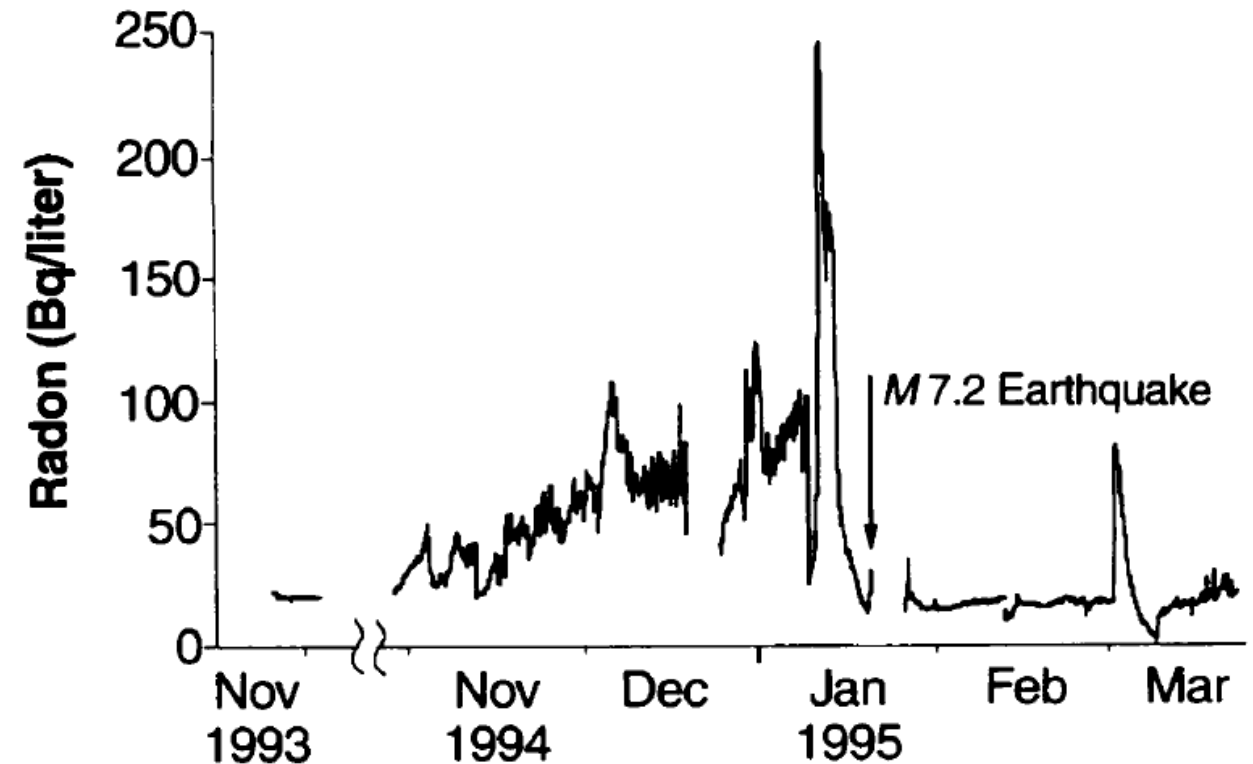


Long – term variations of radon concentration (temperature – corrected value) and the cumulative number of earthquakes with magnitudes $M \geq 5.0$ that occurred at the hypocentral distances less than 200 km (Igarashi et al., 1993).

Radon concentration data

Measurements were taken at a well in the southern part of Nishinomiya city, Hyogo prefecture, Japan

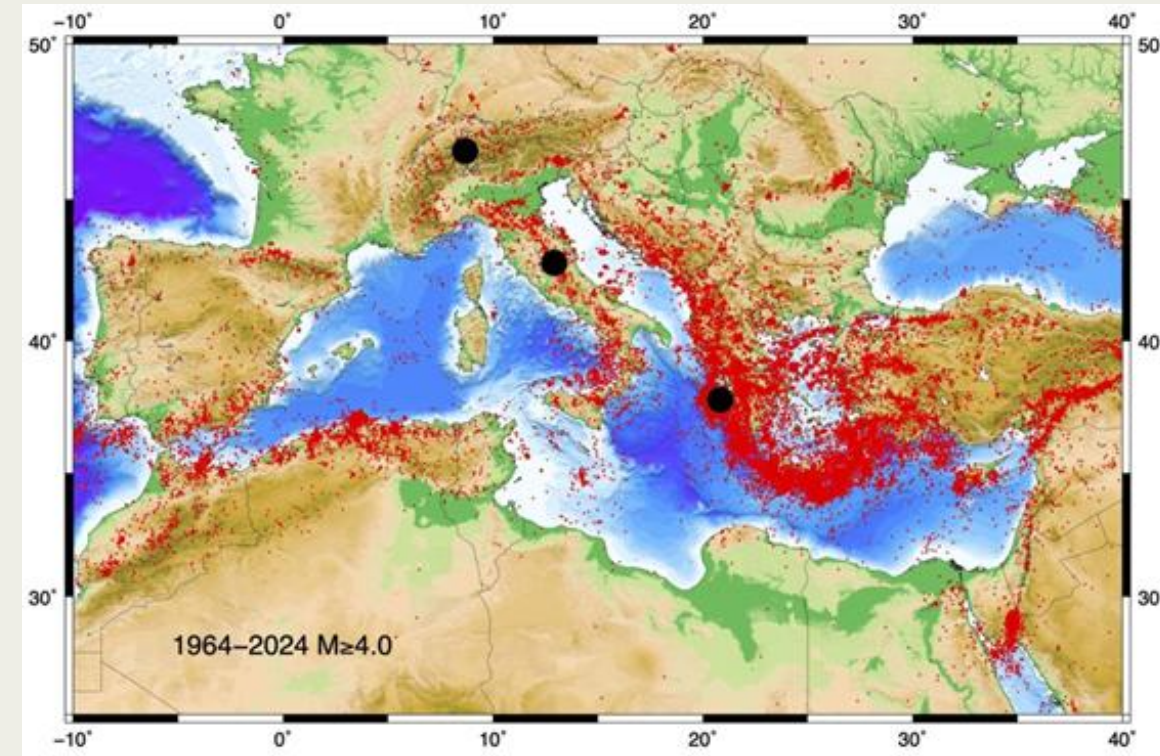
The Kobe earthquake ($M_w 7.2$) occurred on 17 January 1995



artEmis project: Seismicity and test sites

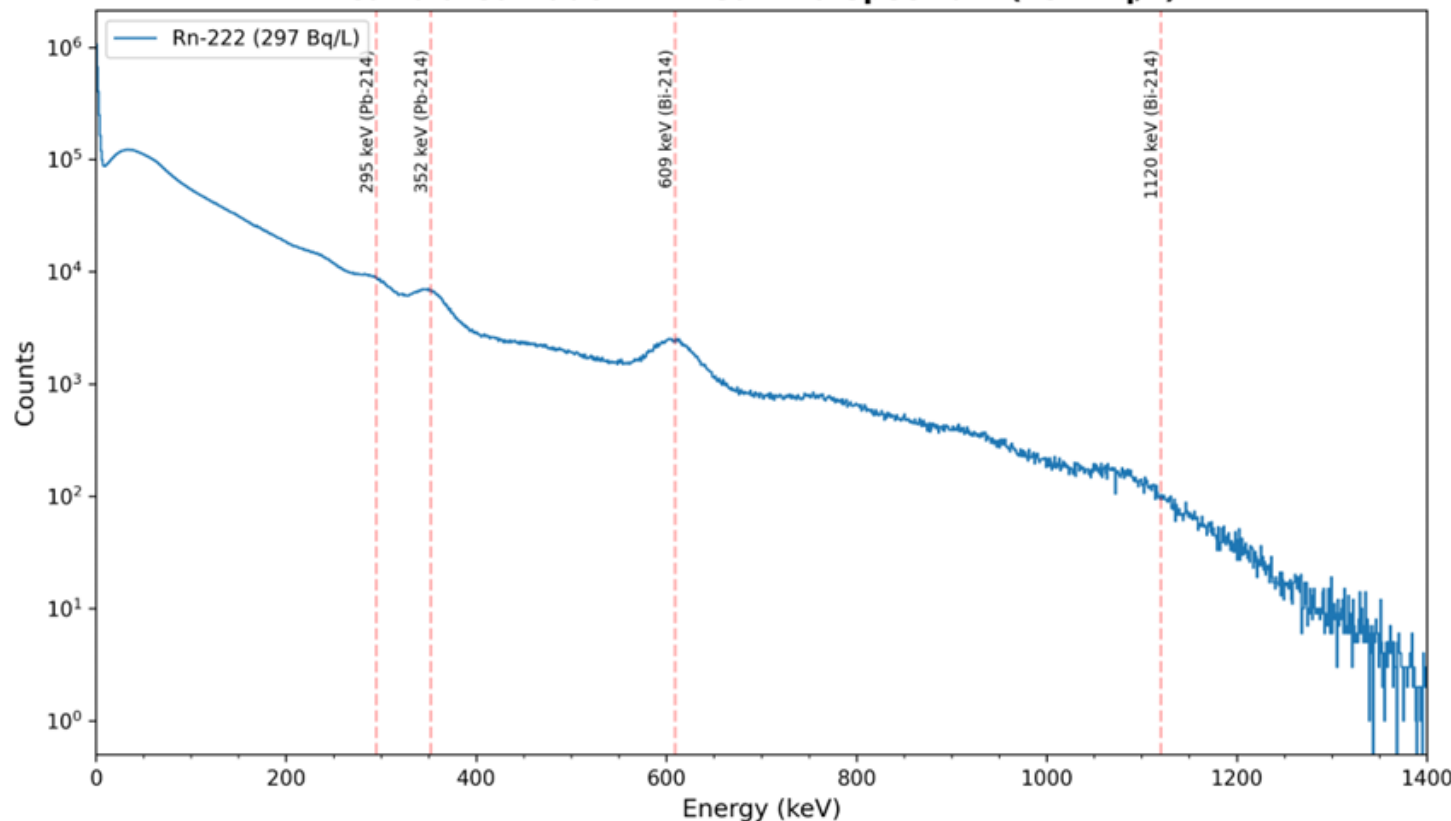
Spatial distribution of a complete data sample with earthquakes of $M > 4.0$ (red dots) during 1964-2024 (On-line Bulletin, last accessed on 04 September 2024, <https://doi.org/10.31905/D808B830>). Black dots indicate the ArtEmis pilot sites.

Example of casing containing the γ -detector and ancillary sensors.



Calibration of the sensor

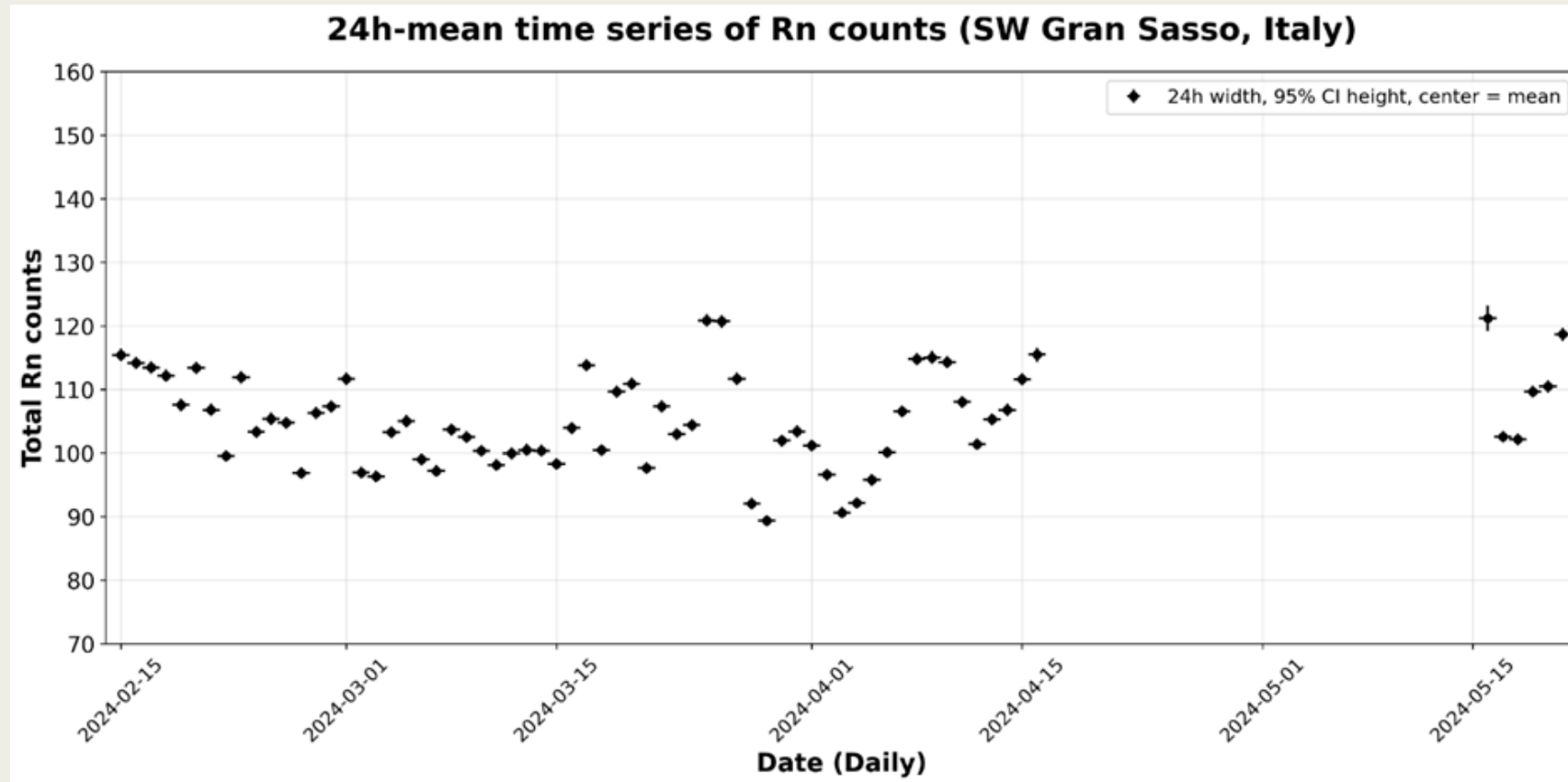
Calibrated Radon-222 Gamma Spectrum (297 Bq/L)



Rn spectrum taken at SURO, where the identified peaks are fingerprints of ^{222}Rn daughters. Due to the measurement inside the water, the spectrum is strongly dominated by Compton events.



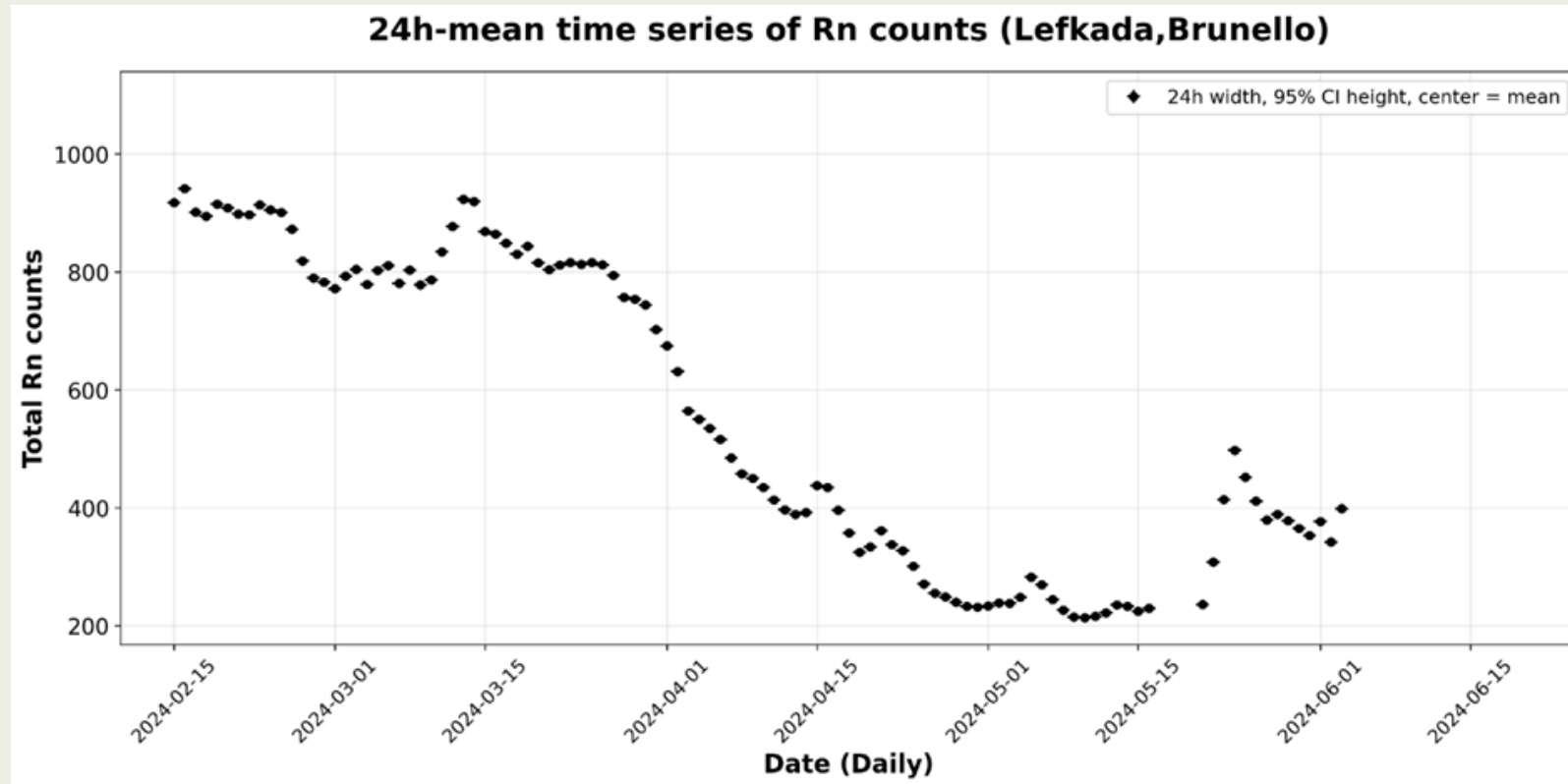
Installation and recordings



Time series of radon counts measured at the Southwest Gran Sasso tunnel



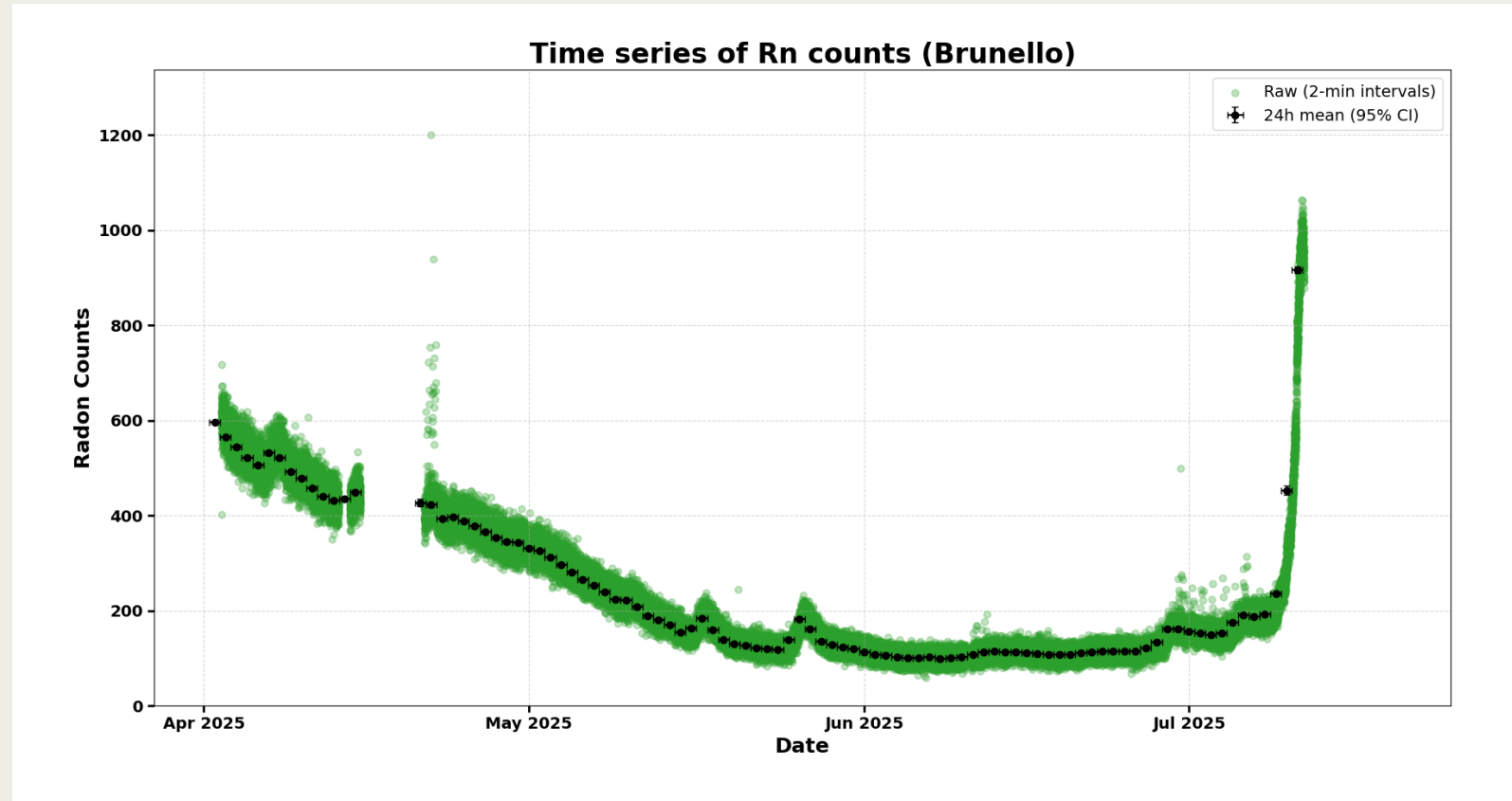
Installation and recordings



Time series of radon counts measured at the Lefkada Island (Brunello)

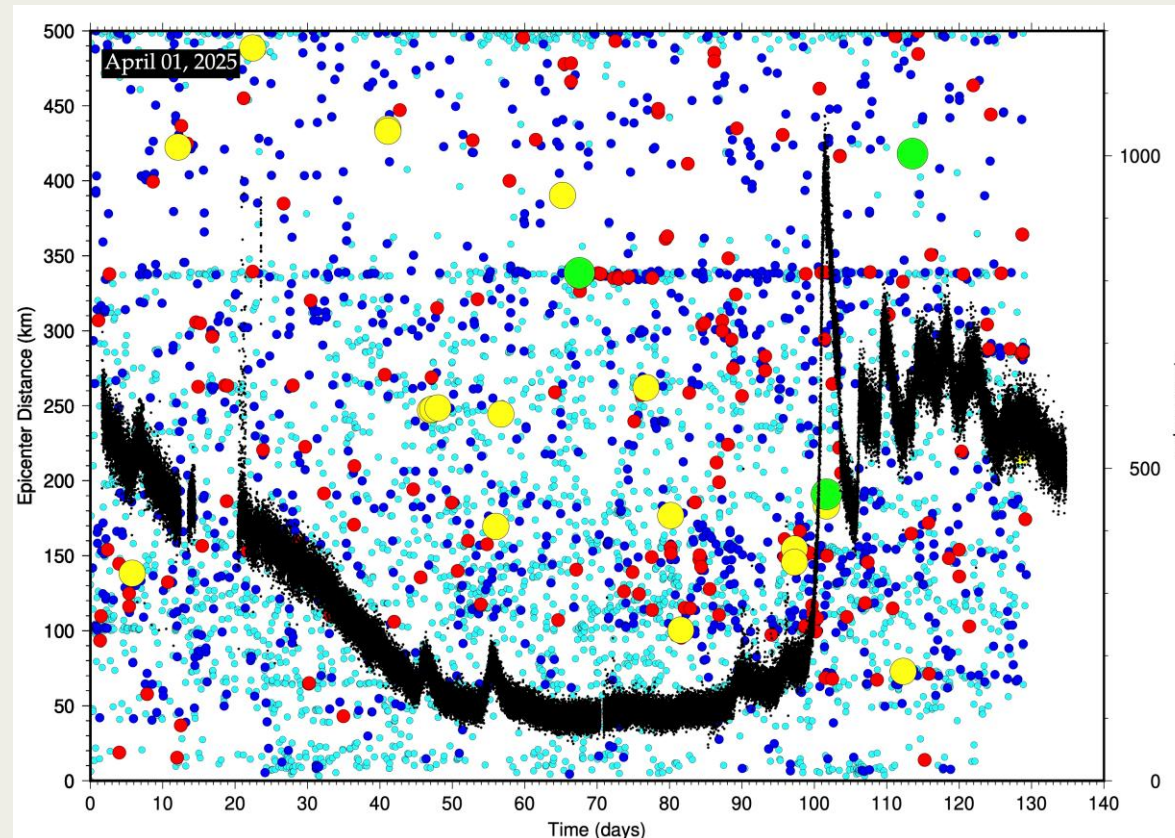


Installation and recordings



Time series of radon counts measured at the Lefkada Island (Brunello)

Installation and recordings



Time series of radon counts measured at the Lefkada Island (Brunello)



Thank you for your attention!