

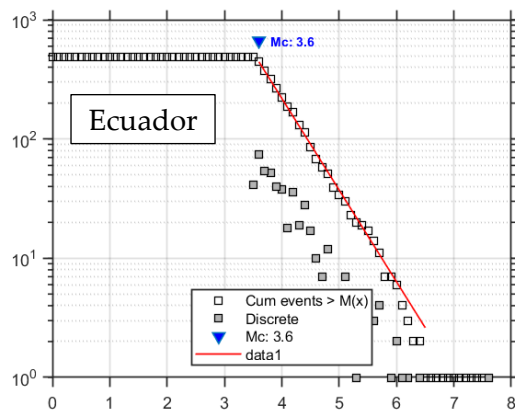
Developing a Fuzzy Inference System based on multi-sensor data to predict powerful earthquakes parameters

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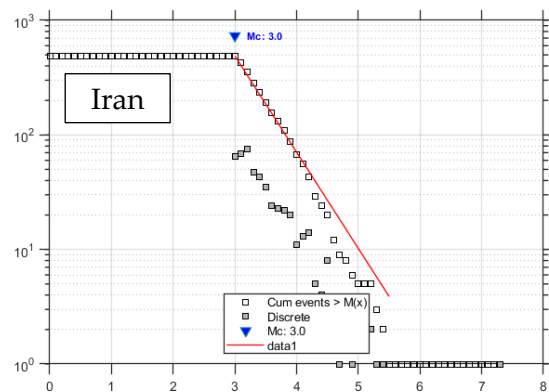
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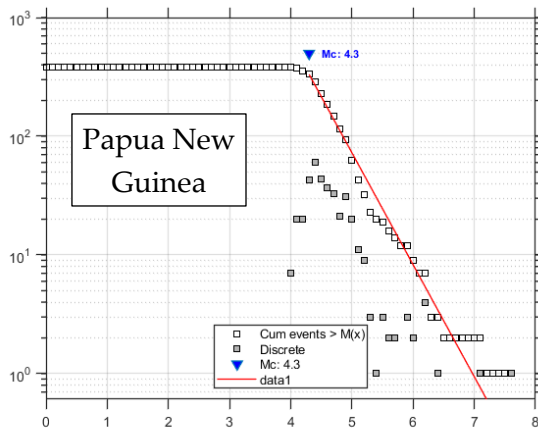
Supplementary Materials



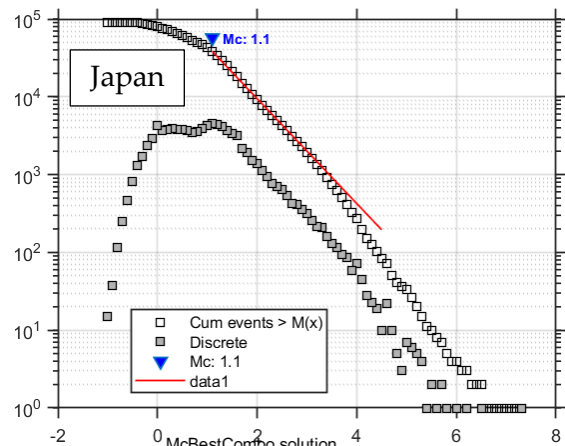
McBestCombo solution
b-value = 0.77 \pm 0.04
a-value=5.416, (annual)=5.725
Mc=3.60



McBestCombo solution
b-value = 0.84 \pm 0.03
a-value=5.210, (annual)=5.686
Mc=3.00



McBestCombo solution
b-value = 0.94 \pm 0.05
a-value=6.579, (annual)=6.887
Mc=4.30



McBestCombo solution
b-value = 0.67 \pm 0.00
a-value=5.324, (annual)=5.643
Mc=1.10

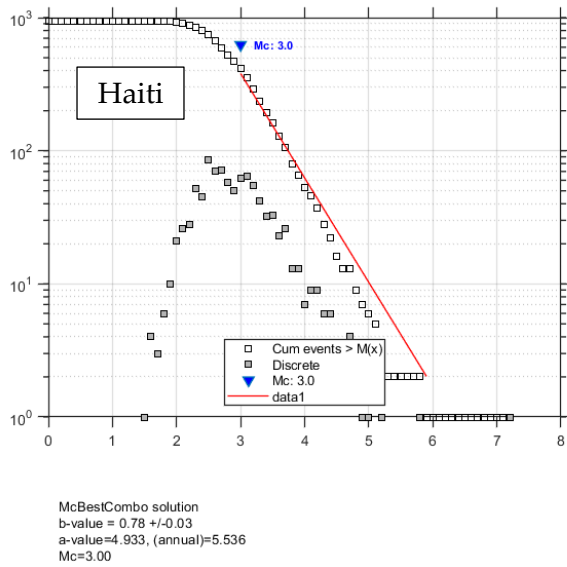


Figure S1: Gutenberg-Richter distributions of the investigated earthquake catalogues with the corresponding magnitude of completeness (M_c) for the case studies of Ecuador, Iran, Papua New Guinea, Japan and Haiti. The distribution represent the events occurred in the time-frame investigated in the paper for each case studies within 1000 km from the epicenter of the case study. They included the mainshock and foreshocks (excluded for the time series input of FIS algorithm).

Ecuador 2016 atmospheric time series:

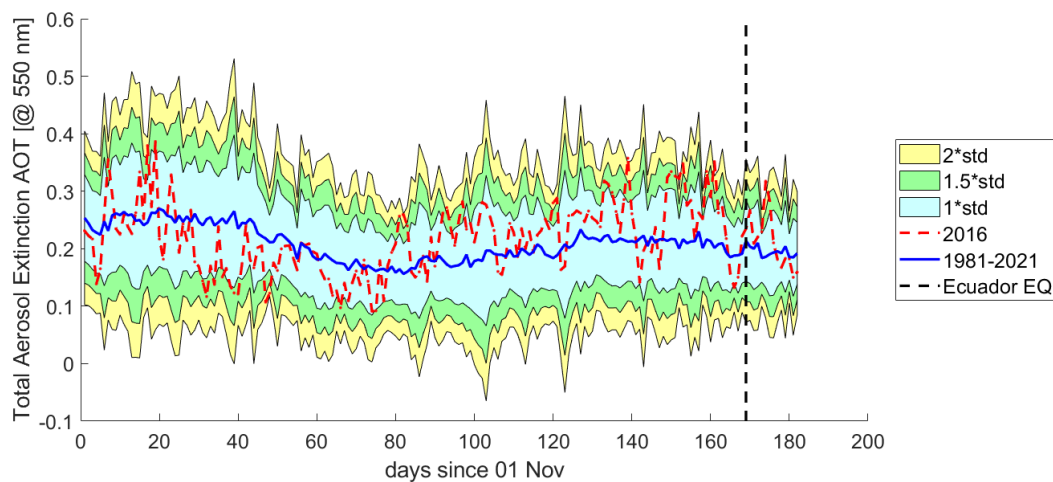


Figure S2: Atmospheric time series of Aerosol in the case study of Ecuador 2016 earthquake, whose occurrence is represented by a black dashed line. The red dashed line represents the values in the year of the earthquake while the blue line represents the historical mean, and its daily 1.0, 1.5 and 2.0 standard deviations are represented by cyan, light green and yellow bands, respectively.

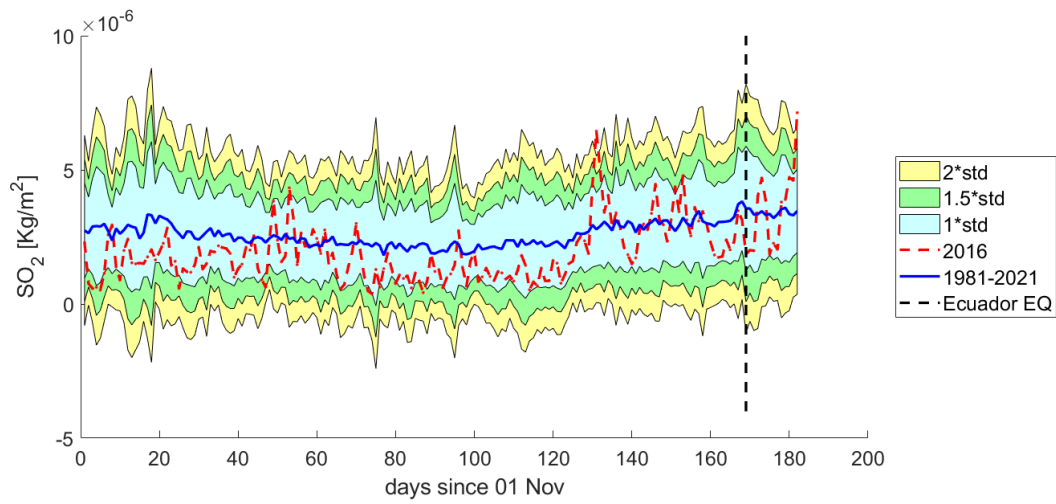


Figure S3 Atmospheric time series of SO_2 in the case study of Ecuador 2016 earthquake. The represented elements are the same as in Figure S2.

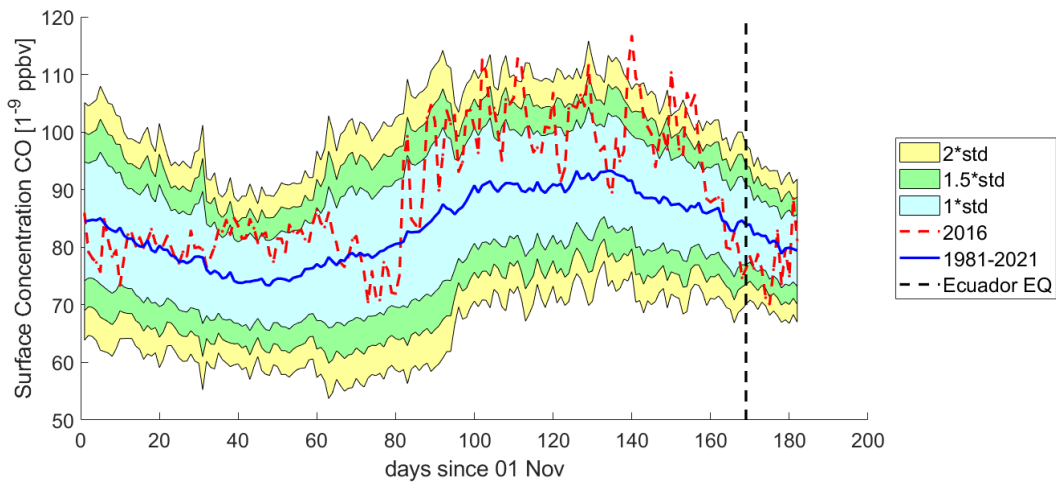


Figure S4 Atmospheric time series of CO in the case study of Ecuador 2016 earthquake. The represented elements are the same as in Figure S2.

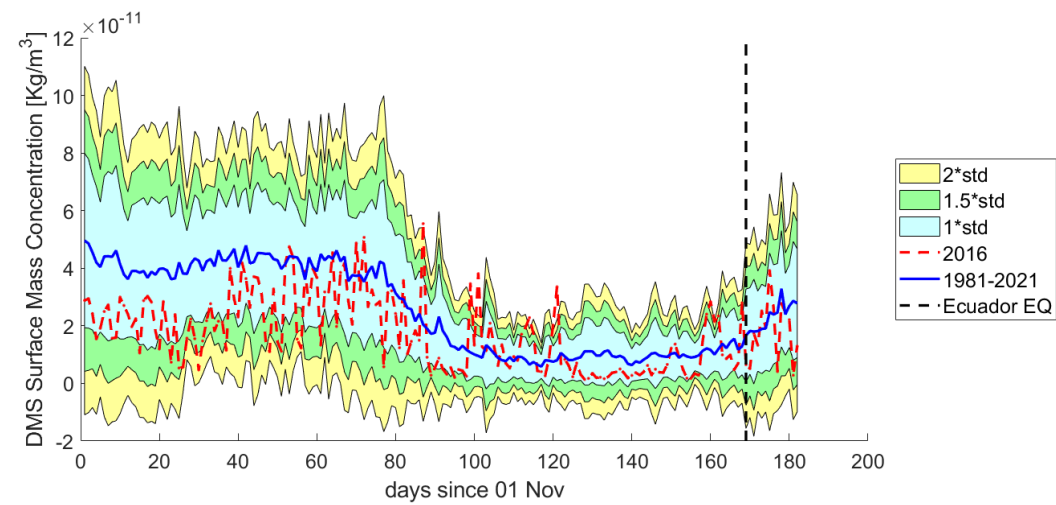


Figure S5: Atmospheric time series of Dimethyl Sulfide in the case study of Ecuador 2016 earthquake. The represented elements are the same as in Figure S2.

Iran 2017 atmospheric time series:

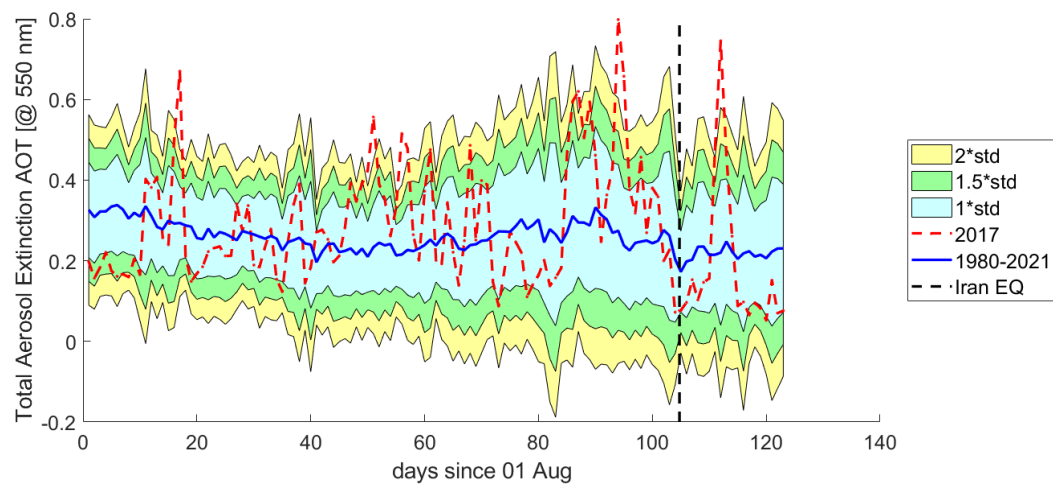


Figure S6: Atmospheric time series of Aerosol in the case study of Iran 2017 earthquake. The represented elements are the same as in Figure S2.

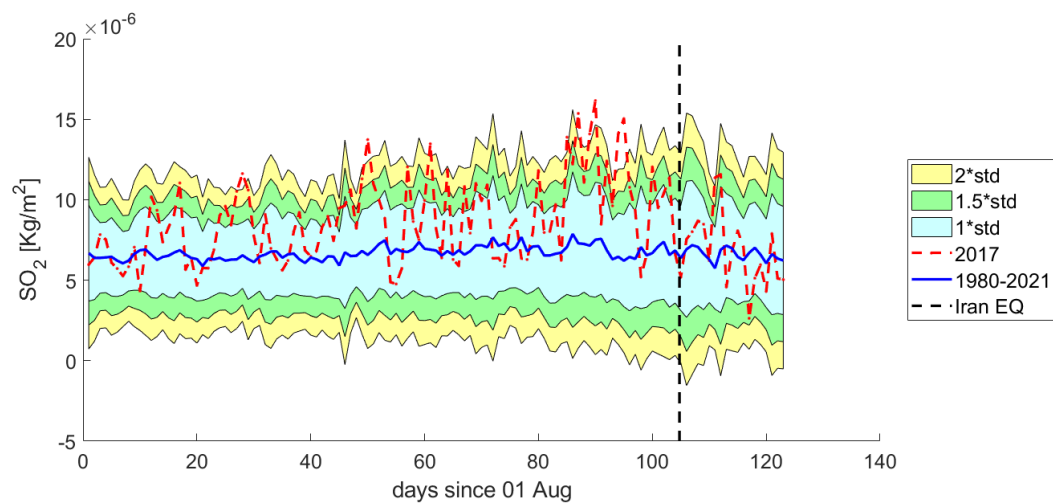


Figure S7 Atmospheric time series of SO_2 in the case study of Iran 2017 earthquake. The represented elements are the same as in Figure S2.

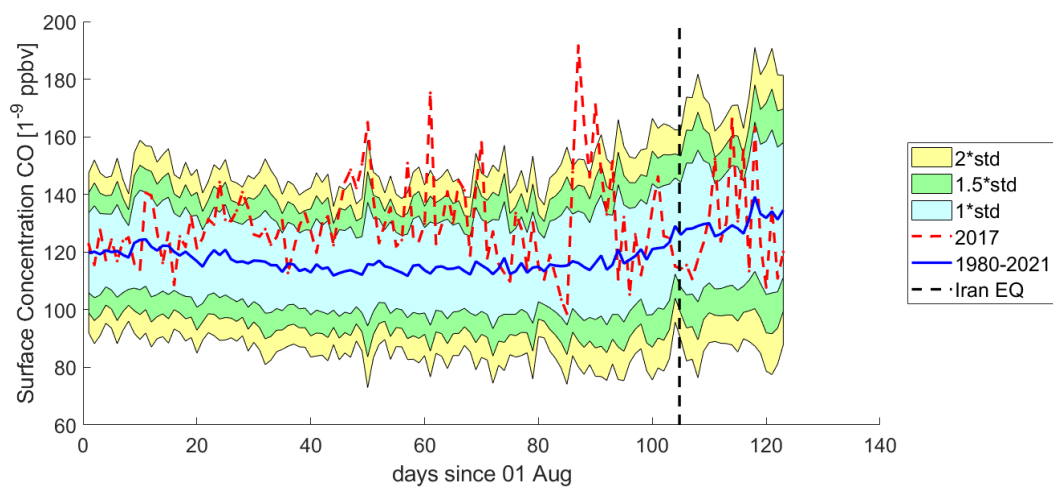


Figure S8 Atmospheric time series of CO in the case study of Iran 2017 earthquake. The represented elements are the same as in Figure S2.

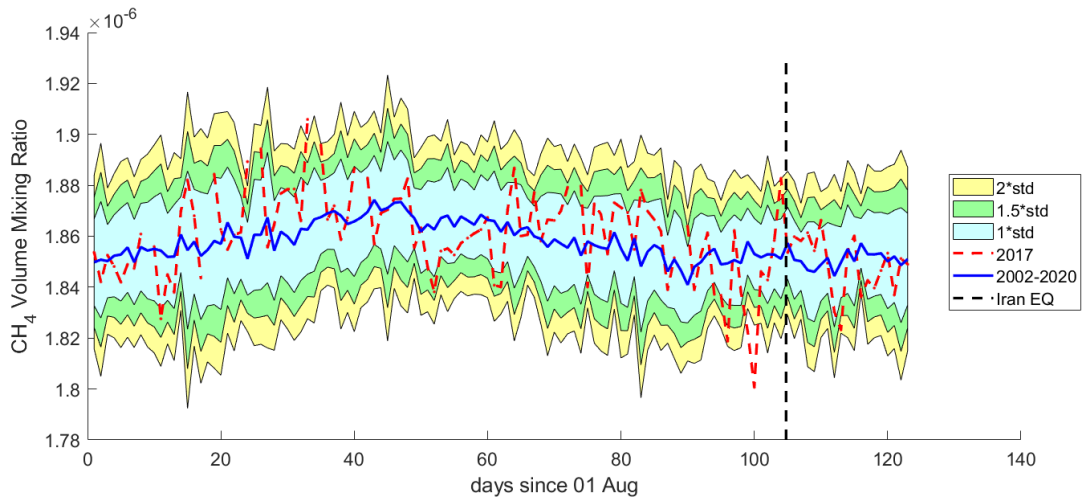


Figure S9: Atmospheric time series of methane in the case study of Iran 2017 earthquake. The represented elements are the same as in Figure S2.

Papua New Guinea 2019 atmospheric time series:

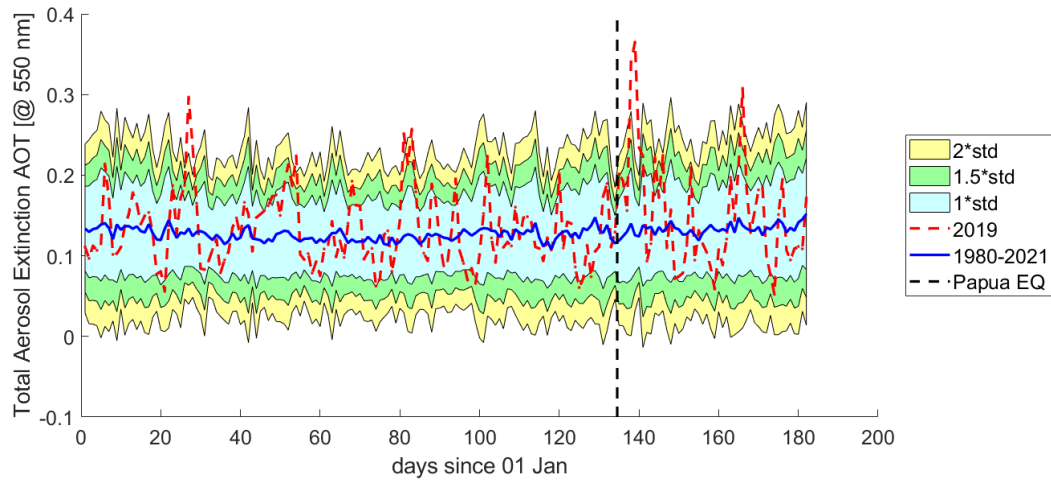


Figure S10: Atmospheric time series of Aerosol in the case study of Papua New Guinea 2019 earthquake. The represented elements are the same as in Figure S2.

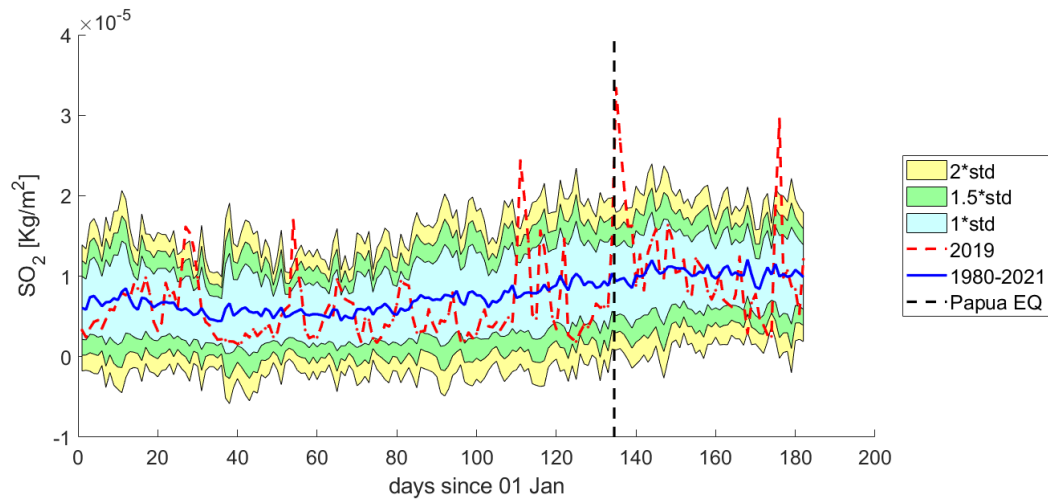


Figure S11 Atmospheric time series of SO_2 in the case study of Papua New Guinea 2019 earthquake. The represented elements are the same as in Figure S2.

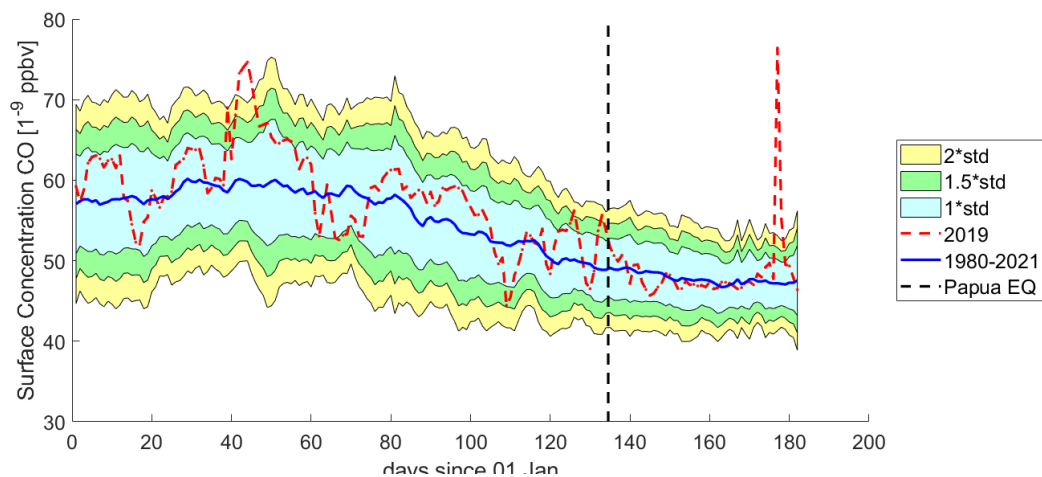


Figure S12 Atmospheric time series of CO in the case study of Papua New Guinea 2019 earthquake. The represented elements are the same as in Figure S2.

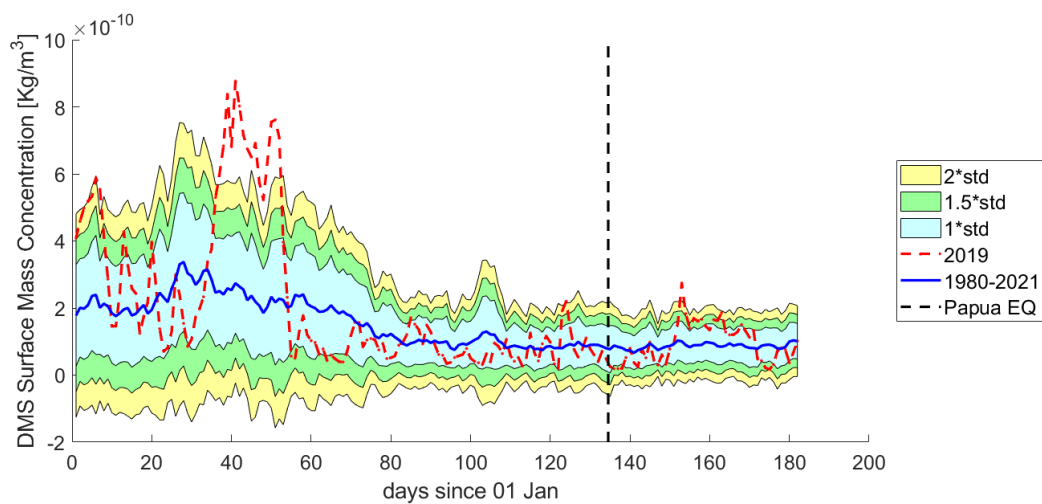


Figure S13: Atmospheric time series of Dimethyl Sulfide in the case study of Papua New Guinea 2019 earthquake. The represented elements are the same as in Figure S2.

Japan 2021 atmospheric time series:

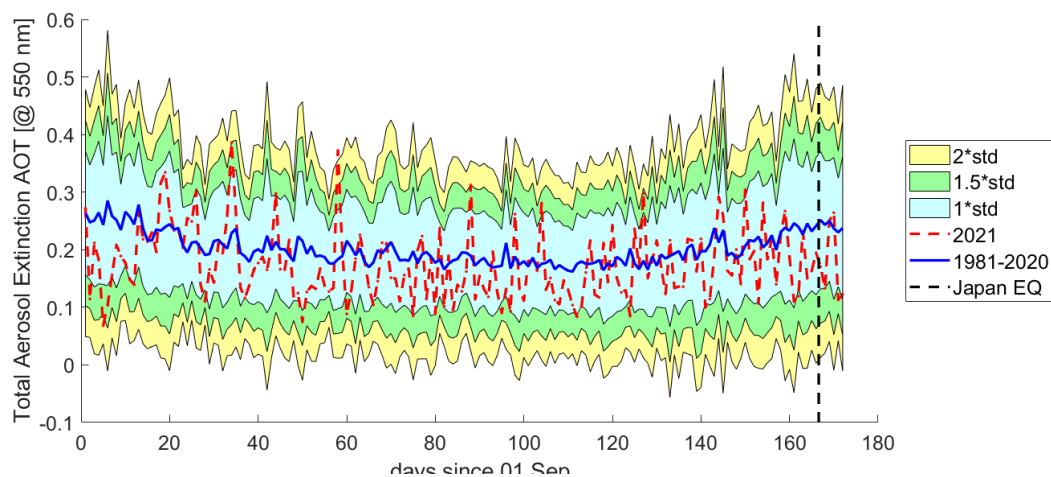


Figure S14: Atmospheric time series of Aerosol in the case study of Japan 2021 earthquake. The represented elements are the same as in Figure S2.

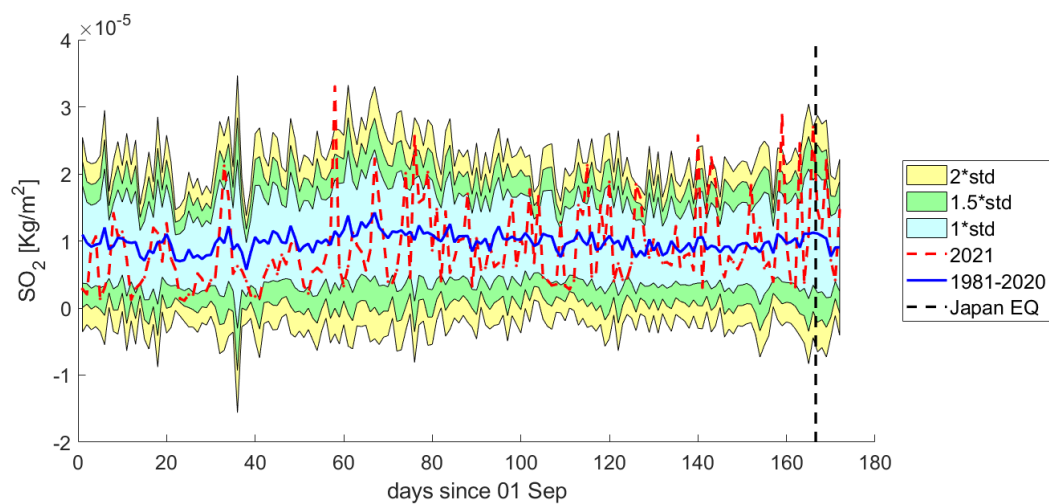


Figure S15 Atmospheric time series of SO_2 in the case study of Japan 2021 earthquake. The represented elements are the same as in Figure S2.

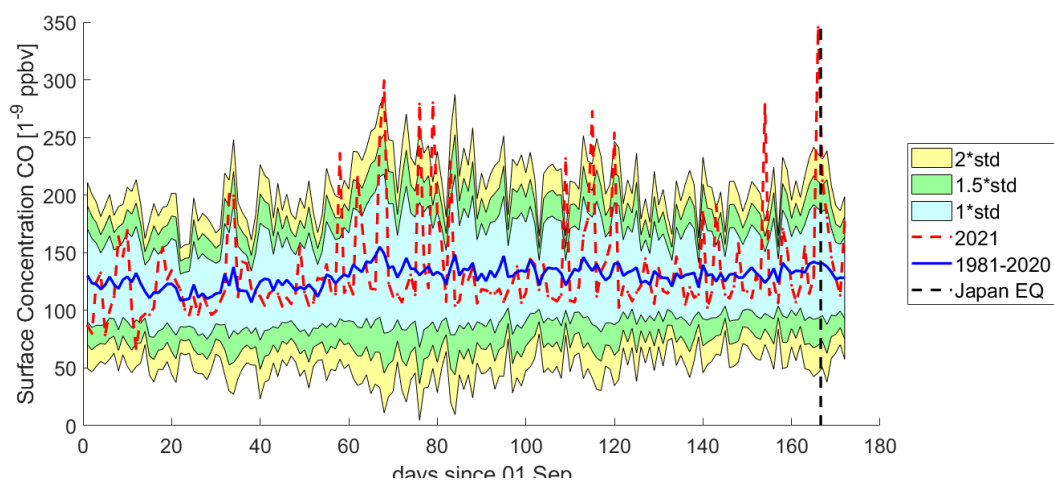


Figure S16 Atmospheric time series of CO in the case study of Japan 2021 earthquake. The represented elements are the same as in Figure S2.

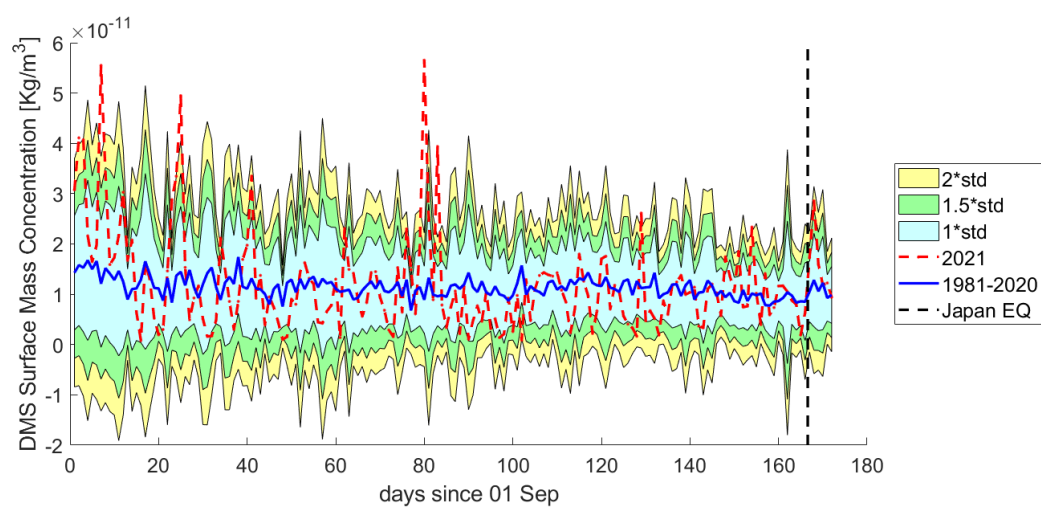


Figure S17: Atmospheric time series of Dimethyl Sulfide in the Japan 2021 earthquake case study. The represented elements are the same as in Figure S2.

Haiti 2021 atmospheric time series:

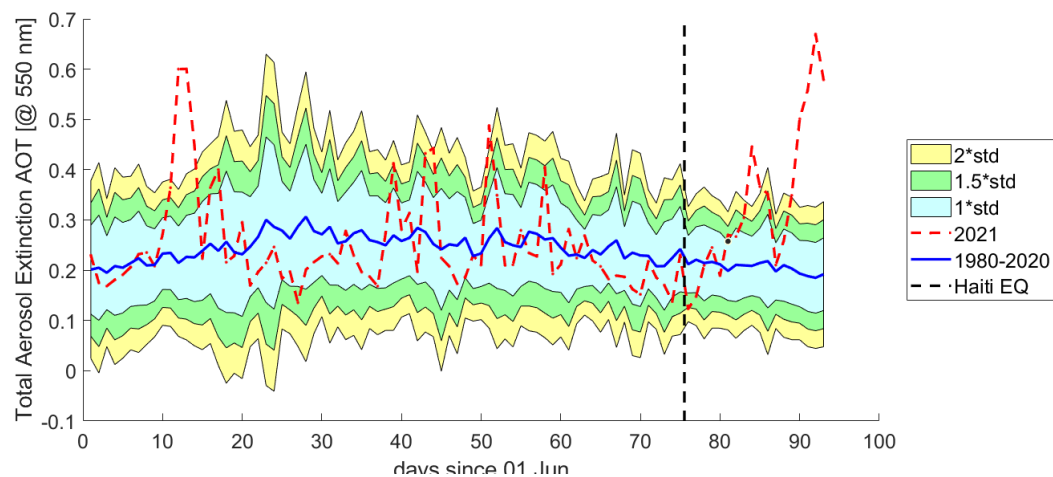


Figure S18: Atmospheric time series of Aerosol in the case study of Haiti 2021 earthquake. The represented elements are the same as in Figure S2.

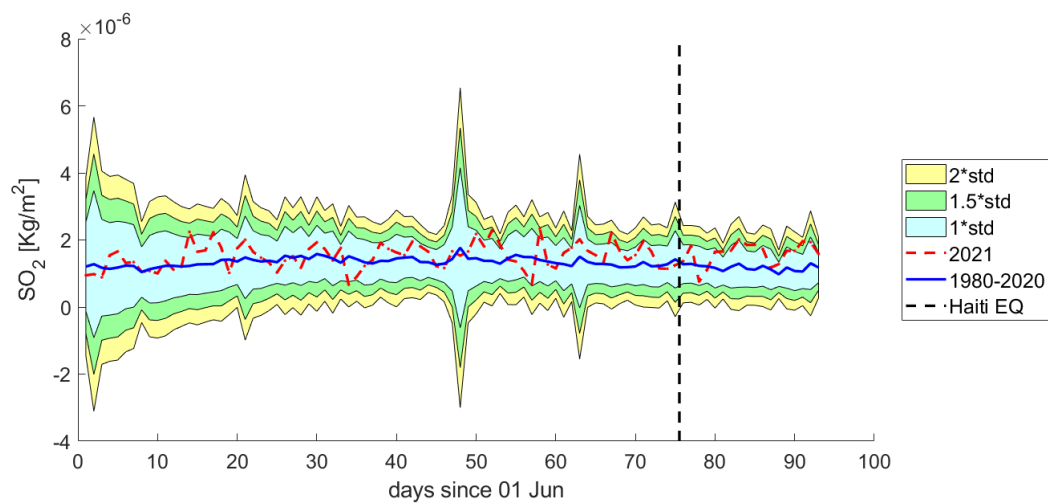


Figure S19 Atmospheric time series of SO_2 in the case study of Haiti 2021 earthquake. The represented elements are the same as in Figure S2.

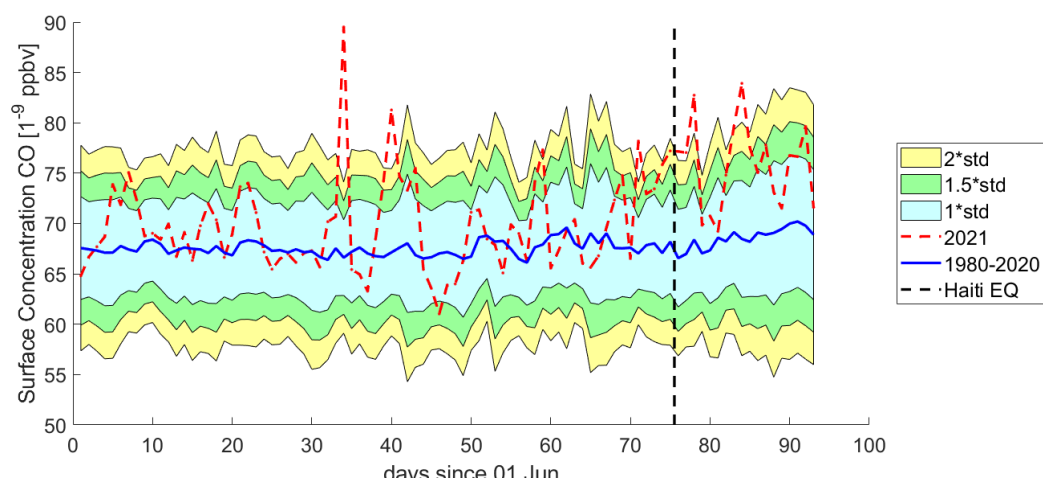


Figure S20 Atmospheric time series of CO in the case study of Haiti 2021 earthquake. The represented elements are the same as in Figure S2.

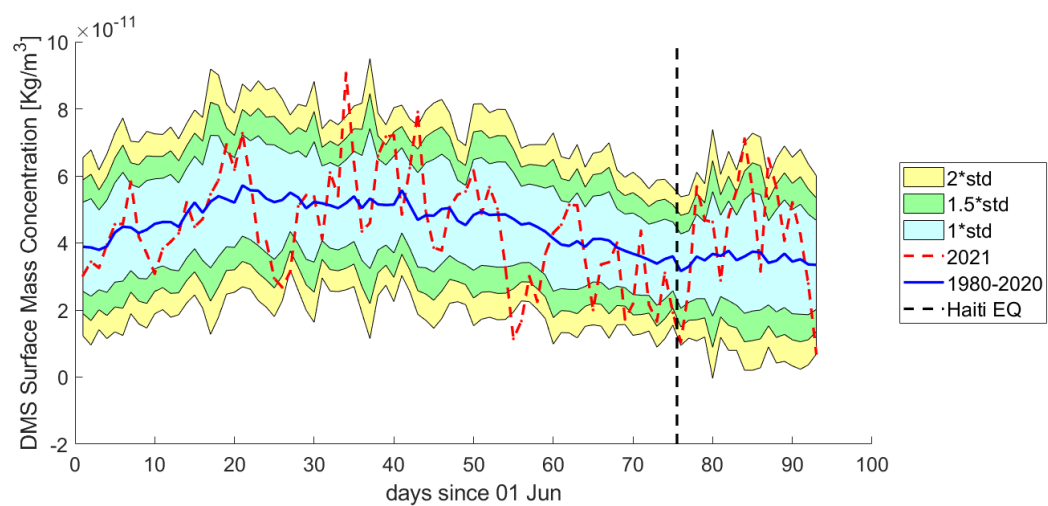


Figure S21: Atmospheric time series of Dimethyl Sulfide in the Haiti 2021 earthquake case study. The represented elements are the same as in Figure S2.