

Supplementary Document for

**A Bayesian approach for Forecasting the Probability of Large Earthquakes
using Thermal Anomalies from Satellite Observations**

Zhonghu Jiao^{1*}, Xinjian Shan¹

¹ State Key Laboratory of Earthquake Dynamics, Institute of Geology, China Earthquake
Administration, Beijing 100029, China; xjshan@ies.ac.cn

*Correspondence: jzh@ies.ac.cn; Tel.: 0086-010-62009661

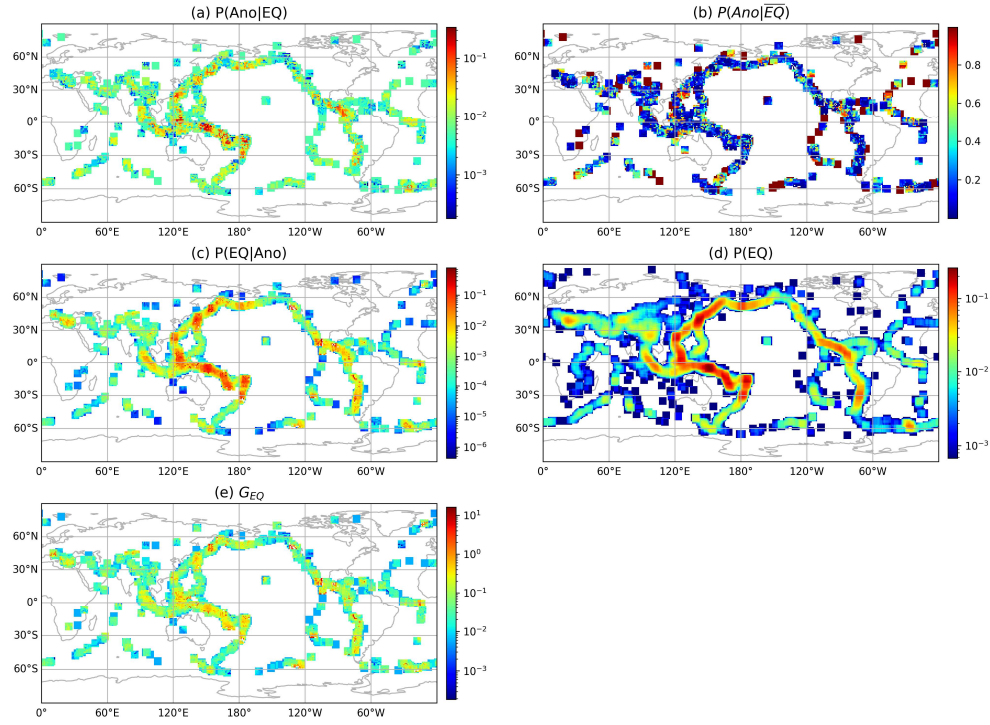


Figure S1 Component analysis of earthquake forecast probability for the ST anomaly on December 31, 2020. (a) Probability of ST anomaly occurrence before earthquakes; (b) Probability of ST anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the ST anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the ST anomaly. Data were log10 transformed to emphasize very low values, except for panel (b).

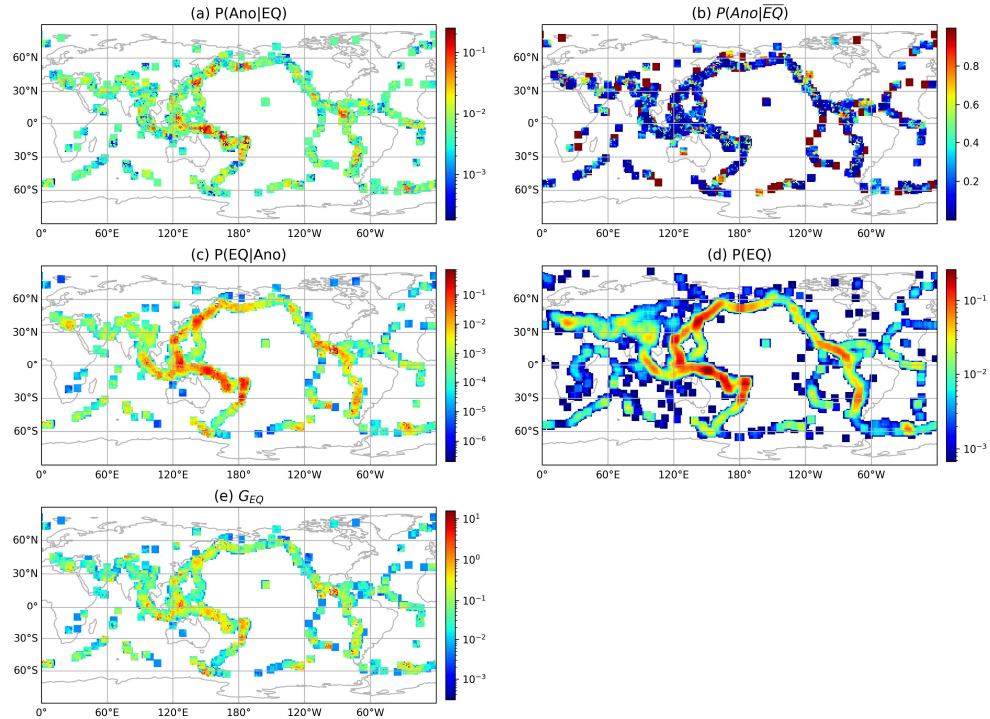


Figure S2 Component analysis of earthquake forecast probability for the AT anomaly on December 31, 2020. (a) Probability of AT anomaly occurrence before earthquakes; (b) Probability of AT anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the AT anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the AT anomaly. Data were log10 transformed to emphasize very low values, except for panel (b).

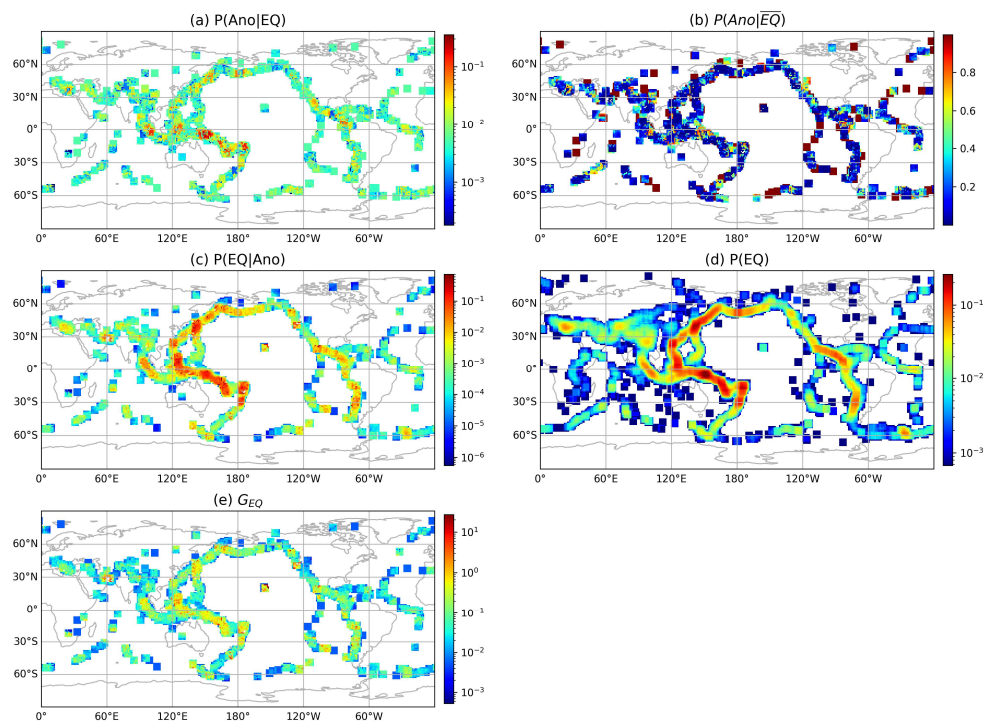


Figure S3 Component analysis of earthquake forecast probability for the CWV anomaly on December 31, 2020. (a) Probability of CWV anomaly occurrence before earthquakes; (b) Probability of CWV anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the CWV anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the CWV anomaly. Data were log10 transformed to emphasize very low values, except for panel (b).

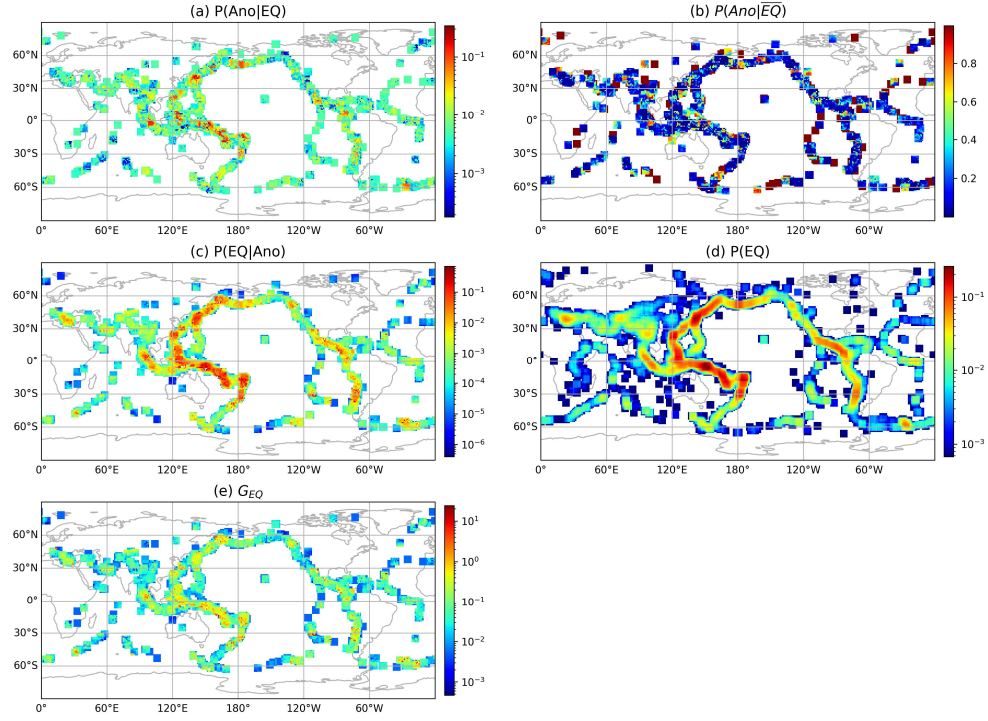


Figure S4 Component analysis of earthquake forecast probability for the COLR anomaly on December 31, 2020. (a) Probability of COLR anomaly occurrence before earthquakes; (b) Probability of COLR anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the COLR anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the COLR anomaly. Data were log10 transformed to emphasize very low values, except for panel (b).

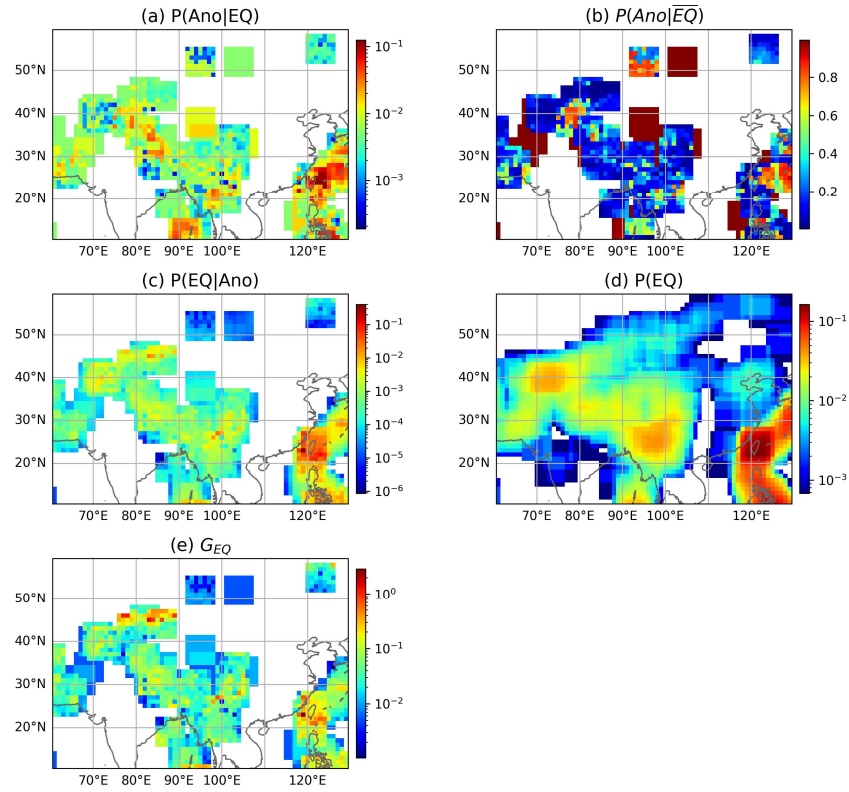


Figure S5 Component analysis of earthquake forecast probability for the ST anomaly in Mainland China and adjacent regions on December 31, 2020. (a) Probability of ST anomaly occurrence before earthquakes; (b) Probability of ST anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the ST anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the ST anomaly. **Data were log10 transformed to emphasize very low values, except for panel (b).**

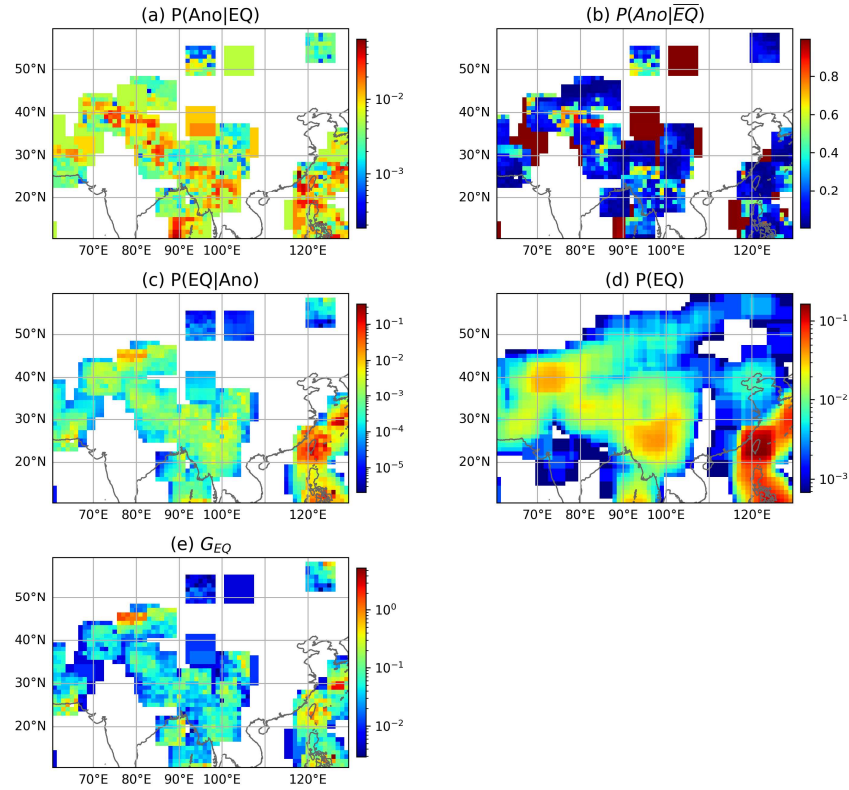


Figure S6 Component analysis of earthquake forecast probability for the AT anomaly in Mainland China and adjacent regions on December 31, 2020. (a) Probability of AT anomaly occurrence before earthquakes; (b) Probability of AT anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the AT anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the AT anomaly. *Data were log10 transformed to emphasize very low values, except for panel (b).*

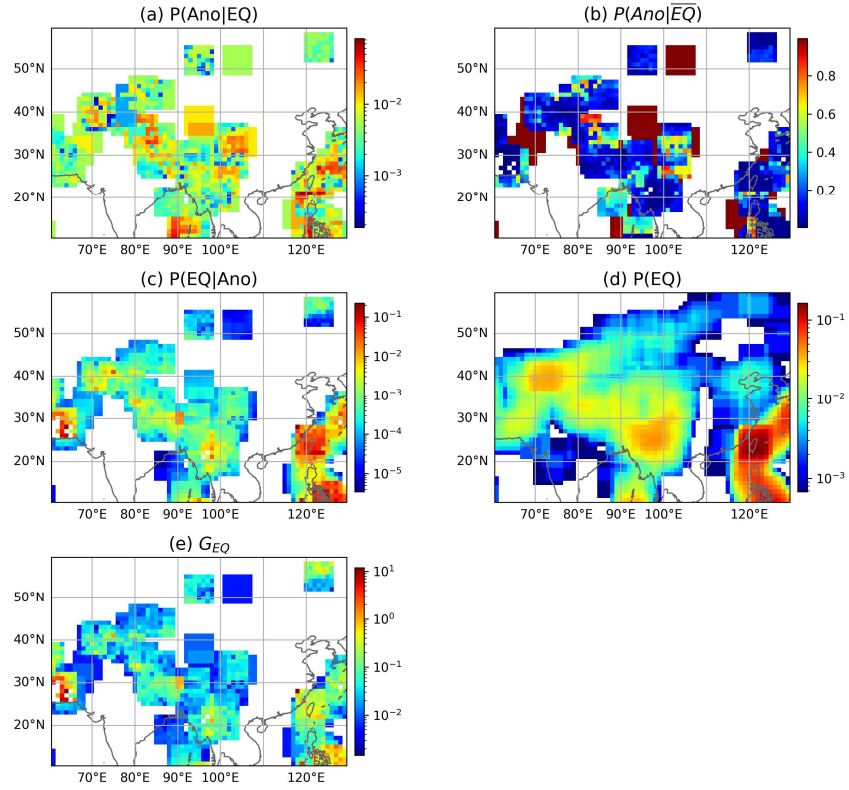


Figure S7 Component analysis of earthquake forecast probability for the CWV anomaly in Mainland China and adjacent regions on December 31, 2020. (a) Probability of CWV anomaly occurrence before earthquakes; (b) Probability of CWV anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the CWV anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the CWV anomaly. Data were log10 transformed to emphasize very low values, except for panel (b).

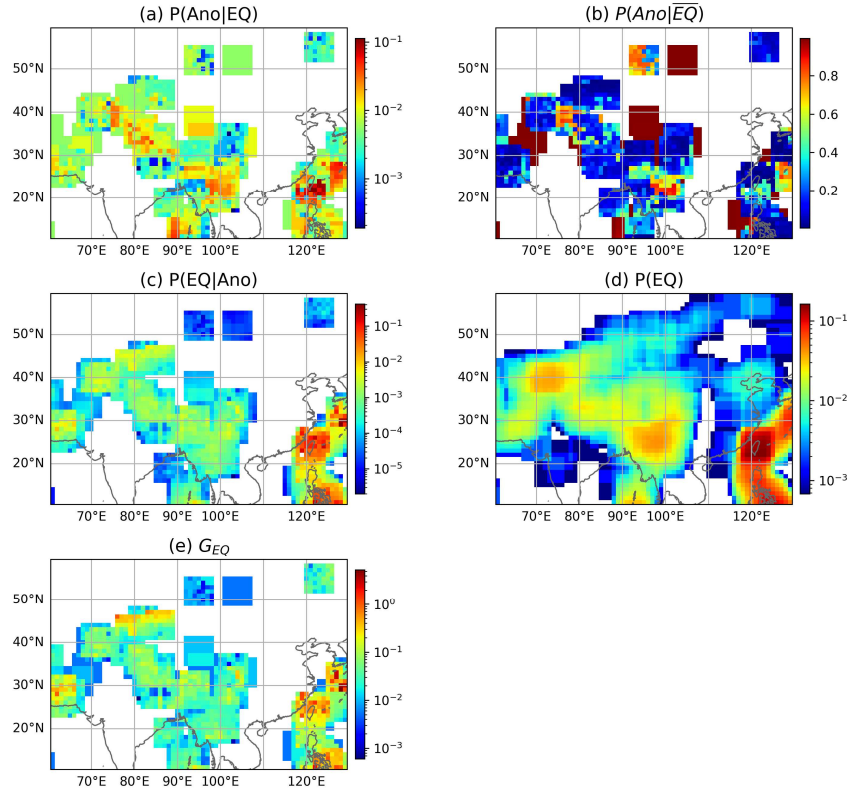


Figure S8 Component analysis of earthquake forecast probability for the COLR anomaly in Mainland China and adjacent regions on December 31, 2020. (a) Probability of COLR anomaly occurrence before earthquakes; (b) Probability of COLR anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the COLR anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the COLR anomaly. **Data were log10 transformed to emphasize very low values, except for panel (b).**

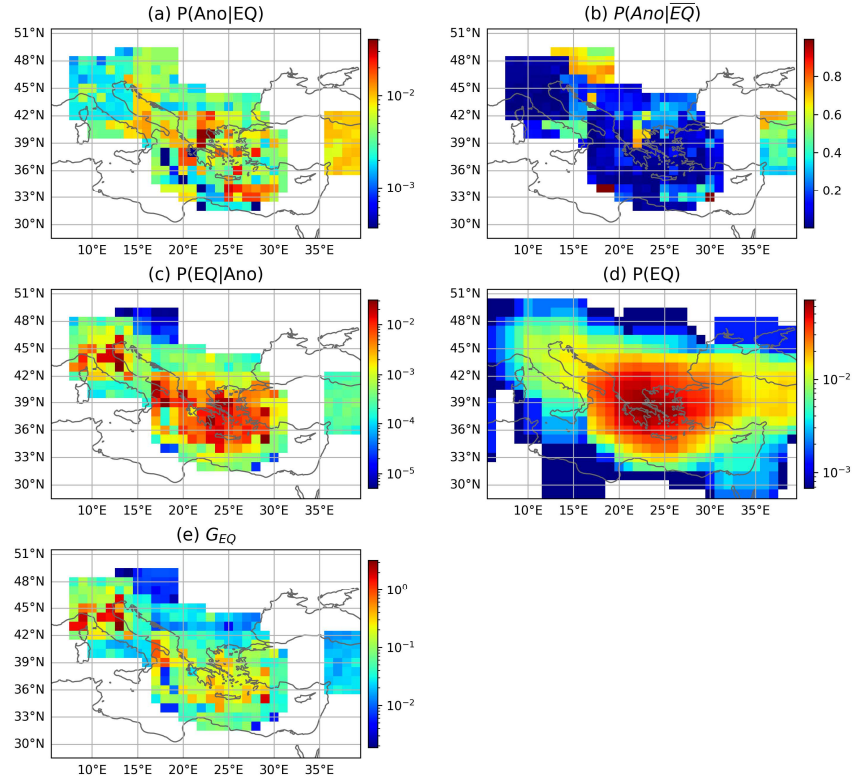


Figure S9 Component analysis of earthquake forecast probability for the ST anomaly in Mediterranean region on December 31, 2020. (a) Probability of ST anomaly occurrence before earthquakes; (b) Probability of ST anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the ST anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the ST anomaly. Data were log10 transformed to emphasize very low values, except for panel (b).

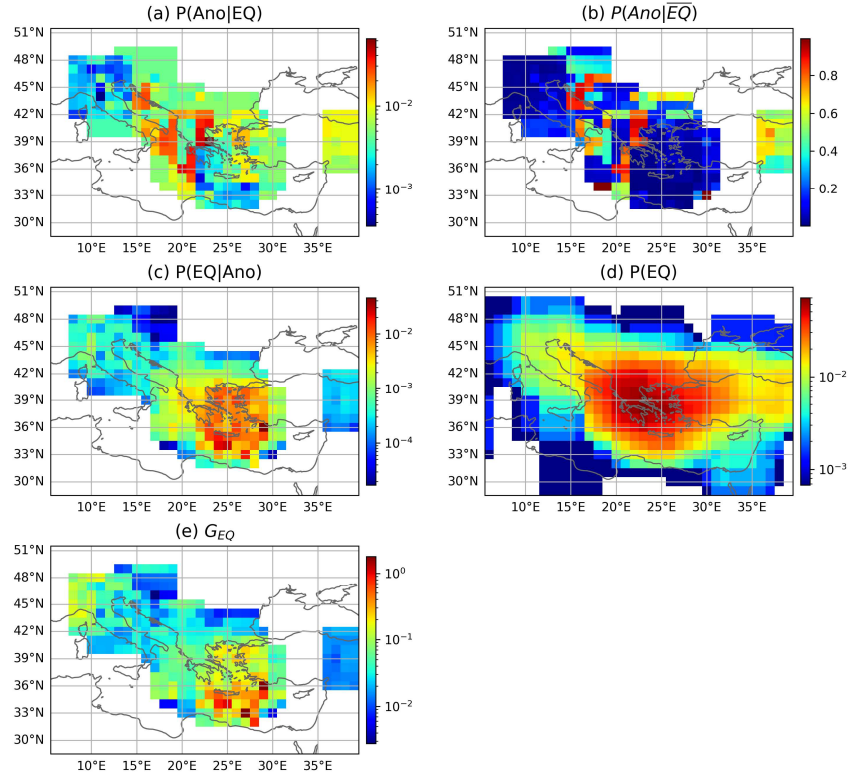


Figure S10 Component analysis of earthquake forecast probability for the AT anomaly in Mediterranean region on December 31, 2020. (a) Probability of AT anomaly occurrence before earthquakes; (b) Probability of AT anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the AT anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the AT anomaly. Data were log10 transformed to emphasize very low values, except for panel (b).

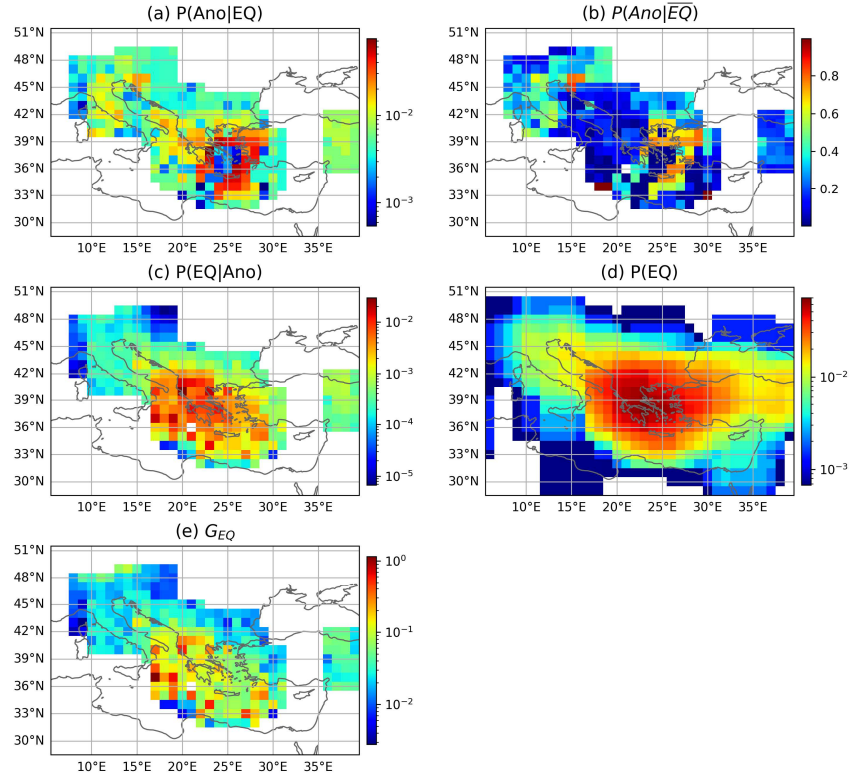


Figure S11 Component analysis of earthquake forecast probability for the CWV anomaly in Mediterranean region on December 31, 2020. (a) Probability of CWV anomaly occurrence before earthquakes; (b) Probability of CWV anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the CWV anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the CWV anomaly. Data were log10 transformed to emphasize very low values, except for panel (b).

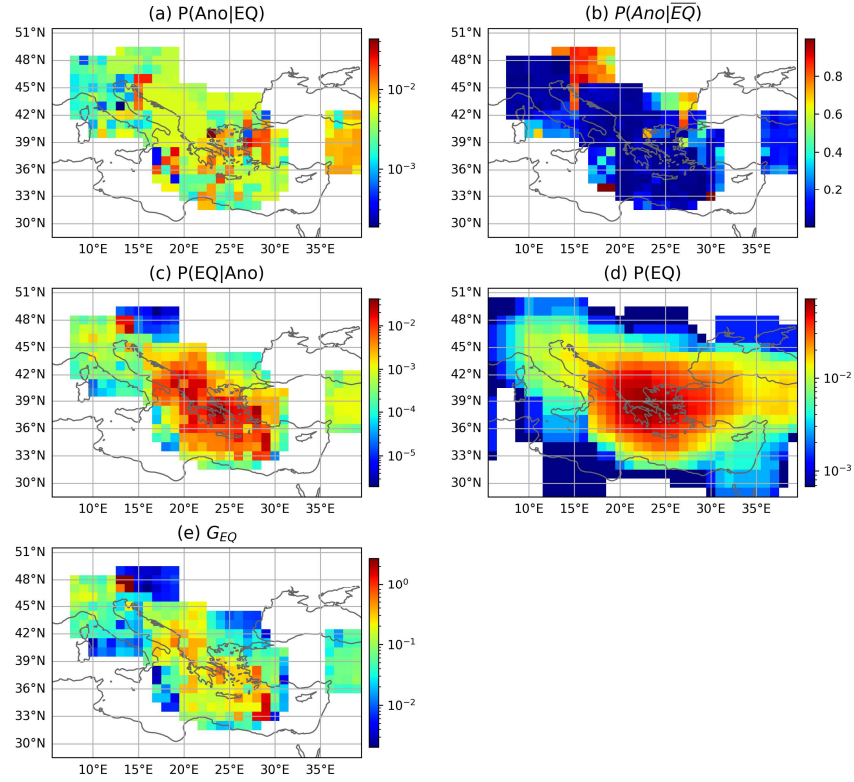


Figure S12 Component analysis of earthquake forecast probability for the COLR anomaly in Mediterranean region on December 31, 2020. (a) Probability of COLR anomaly occurrence before earthquakes; (b) Probability of COLR anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the COLR anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the COLR anomaly. **Data were log10 transformed to emphasize very low values, except for panel (b).**

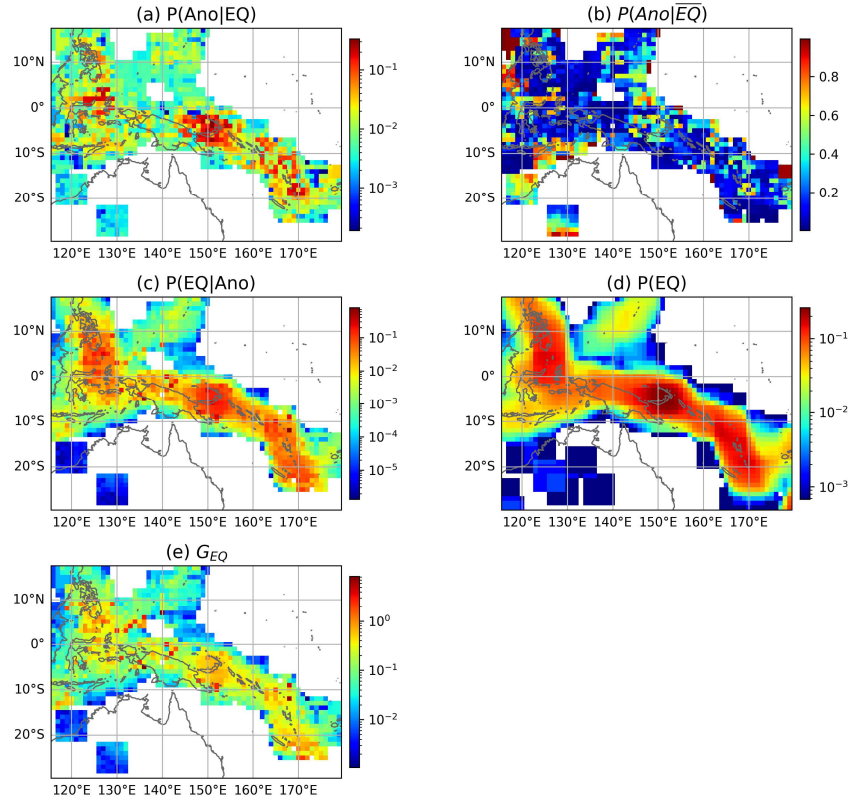


Figure S13 Component analysis of earthquake forecast probability for the ST anomaly in Southeast Asian regions on December 31, 2020. (a) Probability of ST anomaly occurrence before earthquakes; (b) Probability of ST anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the ST anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the ST anomaly. Data were log10 transformed to emphasize very low values, except for panel (b).

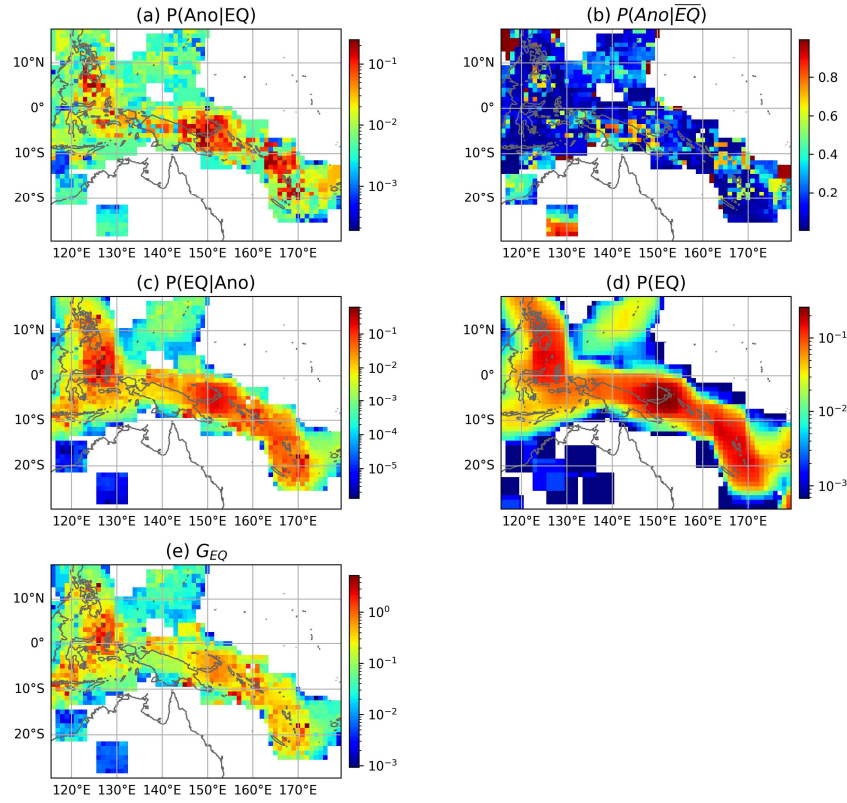


Figure S14 Component analysis of earthquake forecast probability for the AT anomaly in Southeast Asian regions on December 31, 2020. (a) Probability of AT anomaly occurrence before earthquakes; (b) Probability of AT anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the AT anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the AT anomaly. **Data were log10 transformed to emphasize very low values, except for panel (b).**

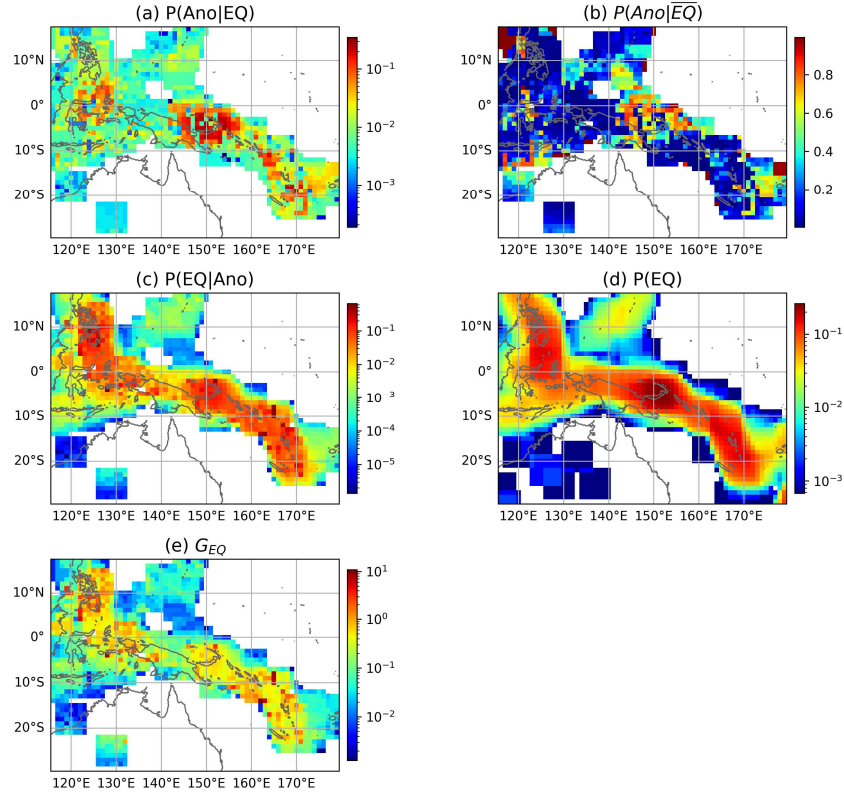


Figure S15 Component analysis of earthquake forecast probability for the CWV anomaly in Southeast Asian regions on December 31, 2020. (a) Probability of CWV anomaly occurrence before earthquakes; (b) Probability of CWV anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the CWV anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the CWV anomaly. **Data were log10 transformed to emphasize very low values, except for panel (b).**

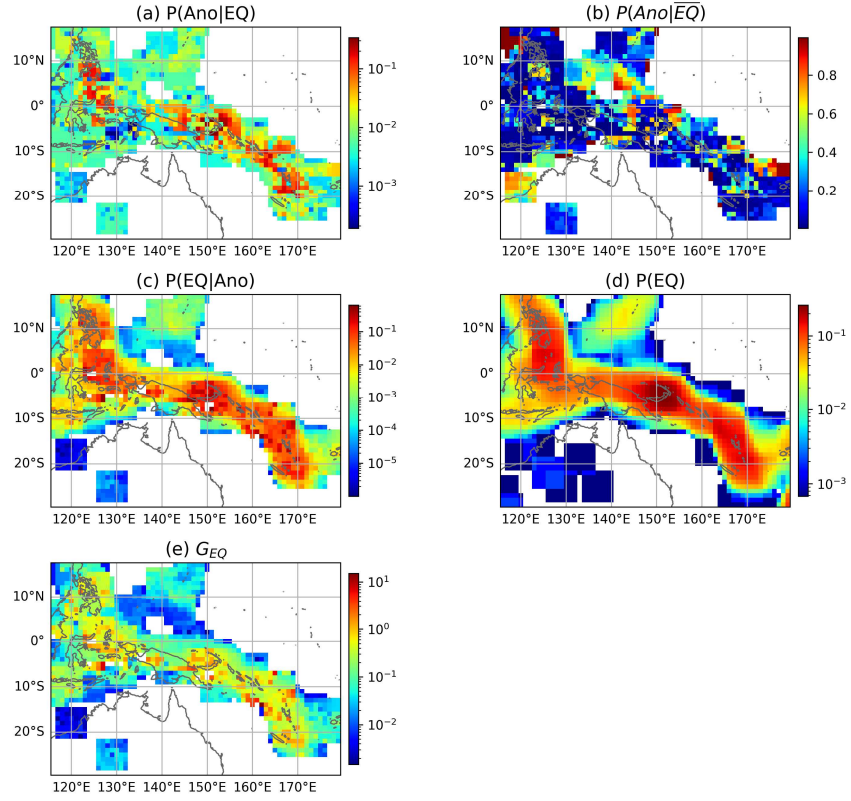


Figure S16 Component analysis of earthquake forecast probability for the COLR anomaly in Southeast Asian regions on December 31, 2020. (a) Probability of COLR anomaly occurrence before earthquakes; (b) Probability of COLR anomaly occurrence without earthquakes; (c) Posterior probability of earthquake occurrence given the COLR anomaly; (d) Prior probability of earthquake occurrence; (e) Probability gain from the COLR anomaly. Data were log10 transformed to emphasize very low values, except for panel (b).