EGU21-4709, updated on 03 Jul 2022
https://doi.org/10.5194/egusphere-egu21-4709
EGU General Assembly 2021

Secondary Microseisms generated by typhoons in the Northwestern Pacific Ocean

Nassima Benbelkacem[1], Eléonore Stutzmann[1], Martin Schimmel[2], Véronique Farra[1], Fabrice Ardhuin[3], Guilhem Barruol[1,4], and Anne Mangeney[1,5]

[1]Institut de Physique du Globe de Paris (IPGP), Seismology, Paris, France
[2]Institut of Earth Sciences Jaume Almera-CSIC, Barcelona, Spain
[3]University of Brest, CNRS, IRD, Ifremer, Laboratoire d'Océanographie Physique et Spatiale, IUEM, Brest, France
[4]Université de La Réunion, Laboratoire GéoSciences Réunion, Saint Denis, France
[5]Inria, Laboratoire J.-L. Lions, ANGE team, CEREMA, CNRS, Paris, France

Secondary Microseisms (SM) are recorded by seismometers in the period band 3-10 s. They are generated by the interaction of ocean gravity waves of similar frequencies and coming from nearly opposite directions. Typhoons create such ocean waves, and the purpose of this study is to investigate the relationship between typhoons and microseism source characteristics. We focused our study on the Northwestern Pacific and we analyzed seismic signals recorded by the Alaska array and the corresponding storm catalog. While P body waves enable to characterize the amplitude and the localization of the sources, secondary microseisms are dominated by surface waves. Therefore, we apply beamforming technique to the vertical components in order to highlight the weaker body wave signals. This analysis permits us to track the localization of SM sources every 6 hours. Our results show three cases: In the case of one active typhoon, the positions of SM sources are localized close to the typhoon position. In the case of two nearby typhoons acting simultaneously, the SM sources are localized in between the typhoons. Finally, when the typhoon arrives close to the coast, we observe sources generated by ocean wave reflections. In conclusion, the three mechanisms proposed by Ardhuin et al., (2011) are necessary to explain secondary microseisms generated by typhoons.