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Analysis of multi-site and multi-components earthquake-generated rotational ground motion: from tele-seismic to local distances.

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2017 has been a turning point for what concerns the seismic instrumentation dedicated to the detection of rotational ground motions. For the first time a large ring laser system called ROMY is able to reconstruct with unprecedented sensitivity the ground rotation vector. With this new experiment the number of rotational observatories grows up to three. We have since years consistent observations from the G-ring in Wetzell, Germany and, since 2015 stable observations from Gingerino in Gran-Sasso, Italy. At the same time a commercially available three component portable sensor is available (Blueseis3A by IxBlue).
It i[U+0080][U+0099]s common practice since decades ago to observe translational ground motions generated by earthquakes in a global scale by means of broadband seismometers networks but global multi-site observations of the rotational component of tele-seismic events is still missing.
In this work for the first time we compare and analyze the rotational ground motion generated by the same earthquakes (Mexico Mw 8.0, Kamchatka Mw 7.6, Iraq Mw 7.2) occurred in 2017, as detected by different Instruments at different sites. This permits for example to highlight the role of the local crustal structure causing the P-SH near-receiver conversion. This causes the observed rotational signals in the P-wave coda. On the other hand, the availability of six components observations from the ROMY ring laser and from the Blueseis3A, permits us to completely characterize the seismic wavefield in terms of wave type, direction of propagation and polarization on real data.