

Date, Lunar Phase and Time of Giant Earthquakes might be Specified for Each Subduction Zone

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There are several studies which suggest that the tidal force affects earthquake occurrences. The studies focus on earthquake precursory of Sumatra (Tanaka, 2010), non-volcanic tremor resulting from slow slip events (Nakata et al., 2008) etc. and statistical analyses were carried out for the fault and slip orientation of each earthquake. On the other hand, it would be very effective to reduce earthquake damages if predictions on date, lunar phase and time of giant earthquake occurrences can be narrowed to a certain practical width. Only the giant main shock, namely MW 8+ earthquakes between 1900 and 2011, were investigated for each subduction zone in this study. UTC is used hereafter. (1) Kuril Islands: Six of the seven earthquakes occurred between Aug. 11 and Nov. 15 on lunar phase between 24.2 and 1.6 days. Five of them occurred between 11:14 and 22:58. (2) Alaska: Five of the six earthquakes occurred during Feb. 4 to May 7. Neither lunar phase nor time dependency is observed. (3) Tonga: Four of the five earthquakes occurred during Apr. 30 to June 26. All events occurred on lunar phase between 0.8 to 6.2 days and between 5:07 and 15:26. (4) Chile: No clear date dependency is observed. However, four of the seven events occurred around the new moon (lunar phase between 22.1 and 1.8 days) and two occurred just before the full moon (lunar phase between 12.0 and 13.6 days). All events occurred during 16:07 and 6:34. (5) Peru: Similar results to Chile. No clear date dependency is observed. However, three of the seven events occurred around the new moon (lunar phase between 2.2 and 3.5 days) and the rest four occurred around the full moon (lunar phase between 12.6 and 18.8 days). All events occurred during 12:08 and 23:40. Mechanism of the above results will be investigated based on the stress change due to tidal force with respect to the representative orientation of each subduction zone.