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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Physical laws for precursory phenomena of impending large earthquakes and their applications to predictions" *by* Fumihide Takeda

Anonymous Referee #1

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In this paper, Fumihide Takeda is trying to investigate the problem of earthquake prediction. Particularly, in this study, the author introduces a virtual particle of unit mass in a property space. The coordinates of this space are the latitude, the longitude, the depth, the time interval between consecutive events and the magnitude and the rupture time. The rupture time here plays the role of a chronological event index. Studying the motion of the virtual particle, periodic anomalous accelerations were detected weeks and months before large impending earthquakes. The periodic particle motions are related to the fault size and motion, rupture time, and the epicenter of impending large earthquakes. The interesting approach and the good overall quality of the present study are needed to be supported with more detailed analysis of the existing results.

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Specific comments:

(a) The present study for the Prediction of fault size, motion, magnitude and rupture time must be extended for all the cases with a magnitude over a specific threshold for the better evaluation of the suggested method.

(b) The present study must be framed by the appropriate statistical analysis of the results including the false alarm rate.

(c) This analysis is closely related to the natural time analysis in which the order of the event (as an index) is also considered as one of the main characteristics of the examined time series. I am suggesting the following two references to be included:

Natural-time analysis of critical phenomena: The case of seismicity PA Varotsos, NV Sarlis, ES Skordas, S Uyeda, M Kamogawa EPL (Europhysics Letters) 92 (2), 29002

Natural time analysis of critical phenomena P Varotsos, NV Sarlis, ES Skordas, S Uyeda, M Kamogawa Proceedings of the National Academy of Sciences 108 (28), 11361-11364

(d) The analysis of the "Automatic detection of anomalies leading to the catastrophes of physical systems" needs improvement including for example among others a cross-correlation diagram respect to the time.

Technical corrections:

(a) The quality of the figures needs improvement

(b) Grammatical errors:

Page 1, line 26: with Global -> by Global

Page 1, line 30: on crustal surface -> on the crustal surface

Page 2, line 4: As an example of many test -> As an example of many tests

Page 4, line 23: oscillometeric -> oscillometric

Page 4, line 26: complete -> a complete

Page 6, line 26: Similarly -> Similarly,

Page 7, line 31: reginal -> regional

Page 8, line 4: Similarly -> Similarly,

Page 8, line 14: every large and great events -> every large and great event

Page 10, line 2: Similarly -> Similarly,

Page 10, line 14: by arrow -> by an arrow

Page 11, line 16: and main event, -> and main event

Page 11, line 17: The sequence appears as a cycle of strain energy accumulation and release to the M9 event, -> release: wrong grammar

Page 11, line 24: characterized with magnitude -> characterized by magnitude

Page 12, line 12: about a year and half -> about a year and a half

Page 12, line 19: which appear -> which appears

Page 12, line 28: prediction on the fault size and motion -> prediction of the fault size and motion

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