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Lithosphere dynamics and earthquake modelling for seismotectonic analysis and hazard assessments

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Dynamics of lithospheric plates resulting in localisation of tectonic stresses and their release in earthquakes provides important information for seismotectonics. Numerical modelling of the dynamics and earthquake simulations have been changing our view about occurrences of large earthquakes in a system of major regional faults and about the recurrence time of the earthquakes. Models of tectonic stress generation and its transfer, as well fault dynamics models will be overviewed. I shall present the 35-year efforts in modelling of lithospheric block-and-fault dynamics allowing for better understanding how the blocks react to the plate motion, how stresses are localised and released in earthquakes, and how plate driving forces, the geometry of fault zones, and fault physical properties exert influence on the earthquake dynamics, clustering, and magnitudes. Also, this presentation will illustrate how data analysis and quantitative modelling contribute to advancing seismic hazard assessment.