

EGU24-8300, updated on 17 May 2024

<https://doi.org/10.5194/egusphere-egu24-8300>

EGU General Assembly 2024

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New Frontiers in Geodynamics

Taras Gerya

ETH Zurich, Institute of Geophysics, Department of Earth Sciences, Zurich, Switzerland (taras.gerya@erdw.ethz.ch)

Geodynamics is an actively expanding young quantitative science, which defined its mission very generally as introducing of physical-mathematical methods into traditionally observations-focused Earth and planetary sciences in order to understand and quantify origin and evolution of Earth and other planets. As such, this young science is not limited by any specific object or subject and widens its scope through time. This is a very natural process ('instinctive evolution') since human scales of direct observation are extremely limited in both time and space and since rapid progress of quantitative physical-mathematical and computational methods offers every day new and exceptional possibilities to explore sophisticated physical-mathematical models for understanding intrinsically complex natural processes. As the result of this 'instinctive evolution', new frontiers in geodynamics are (and always were) defined by its expansion toward other fields. Initially, Geodynamics mainly expanded towards Structural Geology and Tectonics. Currently, new Geodynamics expansion tendencies are clearly visible toward: Seismology, Geomorphology, Geochemistry, Petrology, Climatology, Planetology/Astronomy and Biology/Astrobiology. In this lecture, I will give some recent examples of this impressive expansion and outline future expectations and challenges.