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An overview of modeled dynamic histories of rocky planets

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Every planet is singular, with scars and bumps at their surface. One planet, one history. But the physics at play is common to them, connecting planetary bodies together. Tectonics is a common theme of what we can observe on planets of the solar system, and a central question for exoplanets. More than 20 years of geodynamic modelling has resulted in identifying a diversity of tectonic regimes for mantle convection, from very active, like heat-pipe (Monnereau and Dubuffet, 2002 among others) and squishy lid (Lourenço et al., 2020) to almost inert, like stagnant lid (Schmeling and Jacoby, 1982). Tectonics is an emergent property deriving from the intimate structure and composition of a planet. It is also a fundamental piece shaping the surface environment. This presentation will attempt to give an overview of tectonic regimes of planets and propose typical evolutionary scenari, connecting structural and compositional histories from the depth to the surface.

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