Diverse interior and surface evolution paths of rocky planets

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The possible evolution paths of a rocky planet can be very diverse, and depend on several different processes, that are related to for example the planet's mass and compositon. Here I will give an overview of the different geophysical aspects that have been identified in the community in recent years and that are highly relevant for the long term thermal and chemical evolution of a planet - from the interior to the surface and atmosphere. These aspects include amongst others the composition of the planet (for example in terms of iron and volatile content, mantle rock composition, melt redox state, and variations in heat-producing element content), the planet differentation into metal core and silicate mantle, the role of plate tectonics, and volcanic outgassing. Theroretical models of planetary evolution paths can be benchmarked against the observations and rock record available for the solar system bodies (especially Earth, Mars and Venus) and help us to understand the divergent paths of Earth compared to its neighbour planets. In addition, however, the era of rocky exoplanet detection and charaterization (starting just a little bit more than a decade ago with the detection of CoRoT-7b and Kepler-10b) as well as atmospheric observations for example with the JWST give us a much larger quantitative (though less qualitative) dataset of the potential diversity of rocky planet's surface conditions, that link back to different evolution paths of their interior. These observations, coupled with predictive modeling of rocky planet evolution scenarios, can then also give us a better understanding of how unique our own solar system bodies - especially our own Earth - are.