



Heading down early on? Start of subduction on Earth

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How the Earth's earliest crust was formed and when present day plate tectonics (i.e. subduction) and life commenced, remain fundamental questions in Earth sciences. Whereas the bulk composition of the crust is similar to that of rocks generated in subduction settings, it does not necessarily follow that melting and crust formation require subduction. Indeed, many workers suggest that subduction may have only commenced towards the end of the Archean or later. Here we observe that both the stratigraphy and geochemistry of rocks found in Quebec, that have been variously argued to be 4.4 or 3.8 Ga in age, closely match those from the modern day Izu-Bonin-Mariana fore-arc. We suggest this geochemical stratigraphy might provide a more robust test of ancient tectonic setting than individual chemical or isotopic signatures in rocks or detrital minerals. If correct, the match suggests that at least some form of subduction may have been operating as early as the Hadean or Eoarchean. This could have provided an ideal location for the development of first life.