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Is Venus still geochemically active? A descent probe and balloon mission to the deep atmosphere of Venus

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The in-situ exploration of the low atmosphere and surface of Venus is the next step of Venus exploration. Understanding the geochemistry of the low atmosphere, interacting with rocks, and the way the integrated Venus system evolved, under the combined effects of inner planet cooling and intense atmospheric greenhouse, is a major challenge of modern planetology. Due to the dense atmosphere (95 bars at the surface), balloon platforms, complementarily with descent probes, offer an interesting means to transport and land in-situ measurement instruments. Due to the large Archimede force, a 2 cubic meter He-pressurized balloon floating at 10 km altitude may carry up to 60 kg of payload. Combining a descent probe of Huygens type and/or one (or several) low altitude pressurized balloon(s) will allow to measure accurately, with both vertical and horizontal sampling capability, noble gas isotopic ratios and stable isotopes, as well as atmospheric chemical composition, and surface mineralogy, and also to search for volcanic tracers.