

Title: "Volatiles on Mars - from meteorites to sample return "

Abstract:

Volatiles on Mars come in two categories: those, which react or are reaction products, and those which are inert. The latter are the noble gases, which can record processes such as degassing or atmospheric loss without taking part in any reactions that might also happen. In the Martian meteorites they present a complex story that to this day has conundrums to offer – but maybe, just maybe we are getting an atmospheric sample with the first ever sample return mission that would allow us to solve a few of the open questions. Of the volatiles that react or are products of reaction, methane captures our imagination most, because it is enigmatic in its sporadic occurrence, and it could, maybe, if Earth is a good proxy, with all the hedging that language has to offer, be linked to life. But of course, we do not know that. What we know is that water has a long history on Mars, carved channels, and most importantly for this part of the story, altered minerals. This talk will present a personal journey of 25 years of research into the sources, pathways, reactions and sinks of noble gases, methane and water. Thus, the selection is biased, and very much guided by the speaker's own excitement about topics such as the Kr/Xe ratio in the nakhlite Martian meteorites and the water rock reactions that form carbonates on Mars.