

Reading martian rocks searching for ancient life

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Abstract

During the last 50 years, orbital and rover observation has revealed a rich sedimentary record on Mars which demonstrate the former presence of liquid water, with much of this record dating 3.6–3.0 Ga. Studies in martian sedimentary geology have never been more active. martian exploration deeply changed during the last 15 years with the arrival of the Mars Reconnaissance Orbiter and its high-resolution camera in 2006 and with the landing of the Curiosity rover few years later. Both these instruments allowed for the first time reading rocks in unparalleled detail. Orbital imagery has revealed a vast, ancient stratigraphic record and rover missions have enabled detailed sedimentological studies combined with mineralogical and chemical analyses. As on Earth, extra-terrestrial sedimentary rocks may archive information pertaining to ancient climate, tectonics and potentially, life. Considering ongoing and future exploration missions aim to search for life and past climate conditions, sedimentary rock outcrops therefore make desirable targets being this information potentially embedded within martian stratigraphy.

This seminar will show how sedimentologists explore Mars. A general introduction of martian exploration will be presented, followed by recent results of outstanding research in martian sedimentology.

Biosketch

Francesco Salese

obtained a European PhD in Sciences at the Università "G. D'Annunzio" in Pescara. During the PhD he studied the erosional and depositional martian cycle. He completed his education with a master diploma in Space Institutions and Policies at the Società Italiana per l'Organizzazione Internazionale (SIOI) in Rome and he spent a postdoctoral period at the Italian Space Agency in Rome before moving to the University of Nantes (France) where he started studying the geology and hydrology of the Nasa 2020 landing site. During the postdoctoral experience in Nantes, he was awarded by the



European Commission with a Marie Curie Individual Fellowship that he conducted at Utrecht University studying martian fluvial stratigraphy and terrestrial early land plants fluvial environments. For this research, he was awarded the Best Article in Sedimentology and Stratigraphy by the Italian Geological Society. He is now an associate ERC-CG researcher at the Centro de Astrobiologia in Madrid and team-member of the ESA ExoMars CaSSIS camera.

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