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Field study of exhumed channels in Green River and Hanksville areas, Utah, and a comparison with inverted channel features on Mars.

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Inverted channels represent ancient fluvial systems which developed an inversion of relief with respect to their surrounding areas. The relief inversion occurs because valley or channels floors are more resistant to erosion than the neighbouring terrains due to different reasons (e.g. secondary cementation, floors filled in by intrinsically resistant material). Erosion of the surrounding flood plain sediments leaves the channel-bodies with a positive relief. On Earth, inverted channels are often found in arid or desert locations, which have undergone extensive periods of erosion [e.g. 3, 5, 6]. The motivation for studying these features is based on their similarity to sinuous ridges on Mars, such as in Arabia Terra, which have been interpreted as inverted channels [e.g. 2]. Remote sensing analysis has revealed that many of those martian fluvial channels were formed during the Late Noachian through to Early Hesperian [e.g. 4], being therefore particularly important for the understanding of the water activity in the first stages of martian surface evolution and also for developing climate models. To better understand the martian inverted channels we performed a field work in Utah during November 2017, at locations near Green River and Hanksville which contain many of those features [1, 6]. During the field campaign paleo-flow studies and stratigraphic logs were made to characterise the sequence of events that occurred during the deposition of the channels and marginal units to define a possible evolution of similar features on Mars. Field observations were also compared with satellite remote sensing observations to help understand what features might or might not be seen on Mars. Samples of the most characteristics layers were collected to compare their spectral signatures with common river-associated materials (e.g. clays). The results of this study offer support for future detailed remote sensing studies of martian inverted channels within a terrestrial reference frame.

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