

Characteristics of impact ejecta and crater lake of Lonar Crater, India: a terrestrial analogue of Martian impact crater

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Lonar crater, emplaced in the Deccan traps in India, is a 1.88-km-diameter simple impact structure. As the target rocks of the Lonar crater are basalt, it is a good analogue of simple craters on the surfaces of other terrestrial planets, such as Mars. In particular, because the formation age of the crater is very young (i.e., ~52 ka or ~660 ka), the morphology of rampart-type ejecta blanket is preserved around the Lonar crater. The Lonar crater is the only known impact structure on Earth where active hydrological cycles maintain a lake on the crater floor. Accordingly, knowledge on the formation mechanisms of both the Lonar crater and its crater lake would provide a unique opportunity to understand surface environments and habitability of ancient Mars.

In this study, we report results of our geological survey for the Lonar crater, particularly focusing on the characteristic features of ejecta deposits and water supply to the crater lake. On the basis of the results, we will discuss the implications for the formation mechanisms of the rampart craters and crater lakes on ancient Mars.

Keywords: Lonar crater, ejecta, Mars, crater lake, rampart