



## **Catastrophic flood geomorphology in the English Channel compared with Martian outflow channels**

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Giant outflow channels are some of the most distinctive erosional landforms on Mars. The scale of these features, which are several tens of kilometers across and many hundreds to thousands of kilometers in length indicate that major episodes of crustal erosion have occurred on Mars. These valley systems have been interpreted as the erosional response to enormous catastrophic floods based on analogy with landforms found in the Channeled Scabland region of western USA, which were formed by catastrophic drainage of the ice-dammed glacial Lake Missoula. However, lava flows, glaciers and CO<sub>2</sub>-charged flows have also been proposed as fluids responsible for valley incision. Here, we present new high-resolution sonar data from the eastern English Channel shelf that reveals an extensive, anastomosing bedrock-incised valley system carved into the seabed. Analysis of the bathymetric grid permits us to identify an assemblage of geomorphic features associated with the valley that are analogous to features indicative of catastrophic flood scouring. Characteristic landforms observed include longitudinal erosional grooves, streamlined islands, inner gorges and erosionally terraced and smoothed, streamlined valley margins. These geomorphic features bear striking resemblance to landforms observed in the Channeled Scabland and within outflow channels on Mars. Here, we compare the main attributes of these geomorphic features. The English Channel valleys are interpreted to have formed as a consequence of catastrophic failure of an ice-dammed lake in the southern North Sea following breaching of a structural barrier at the Straits of Dover. Our results clearly indicate that catastrophic water flows are the most likely mechanism for carving the Martian outflow channels. Detailed analysis of the English Channel flood-carved terrain will aid interpretation of processes forming the outflow channels.