



## **Siberian rivers and Martian outflow channels: analysis of permafrost-riverbed interaction**

**F. Costard** (1), E. Gautier (2) L. Dupeyrat (1) Ph. Masson (1) G. Neukum (3) and the HRSC Co-Investigator Science Team

(1) UMR 8148 IDES, Interactions et Dynamique des Environnements de Surface, Université d'Orsay, France, (2) UMR 8591, Laboratoire de Géographie Physique, Meudon France, (3) Remote Sensing of the Earth and Planets, Freie Universitaet, Berlin, Germany, fcostard@geol.u-psud.fr

The origin of Martian outflow channels has been subject of considerable debate. Examination of the Martian conditions leads to the idea that analogies may be considered between the Martian and Terrestrial periglacial climates. The goal of this study is to propose an analogy between the Lena River and the Martian outflow channel Ares Vallis based on the interaction between water and permafrost. Ares Vallis and the Lena River are anabranching rivers with high w/d ratio channels. They are comparable in scale and exhibit the same hydrodynamic characteristics (high and variable discharge rate, very low longitudinal profile, sand-size materials). From the analysis of HRSC image data, the comparison of several fluvial variables (slope, specific stream power, width / depth ratio, number of channels, bars and islands, sinuosity) between Siberian rivers and Martian outflow channels reveals similarities which suggest that similar processes have been active on both fluvial systems. Both hydrosystems were or are associated with a periglacial environment characterized by a deep and continuous permafrost. Flow regimes of Martian outflow channels would have been short and highly fluctuating, similar to those of Siberian rivers. The presence of ground-ice and wide rivers observed both on Mars and in Siberia, suggests the occurrence of thermal erosion during the flooding event.