

Svalbard Terraced Fan-Delta as a Terrestrial Analog for Tyras Vallis' Fan-Delta, Xanthe Terra Mars

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Geologic structures and processes studied on Earth can be used to help make observations and interpretations on features we discover on other planets; these structures are referred to as Earth, or terrestrial analogs. Referencing Earth analogs can be useful when trying to determine geomorphological processes or past climate patterns that planets like Mars might have experienced. For this geologic comparison, a map of a terraced fan-delta was created on both Earth and Mars; a terraced-fan delta found in Svalbard, Norway (15.64 E, 77.74 N) and a similar structure found at the end of Tyras Vallis in Xanthe Terra, Mars (49.71 W, 8.43 N). These structures ordinarily form from the transportation of unconsolidated sediment from the confined flow of a channel or valley to the unconfined flow of a shore or crater basin. Both maps were created at a 1:4K scale with a publishing scale of 1:18K on ArcGIS Pro. The Tyras Vallis map was created on Mars Reconnaissance Orbiter's (MRO) High Resolution Imaging Science Experiment (HiRISE) imagery and Svalbard's being created on Landsat and Satellite Pour l'Observation de la Terre (SPOT). A total of 12 units were identified on the Martian structure and 19 units on the terrestrial structure. Each of these geologic units were determined and mapped using differences in value, texture, elevation, and superposition of the surface. Preliminary conclusions on the comparison between these sedimentary features include similarities in their structures including 200+ meter, bifurcating channel units and distinct, scaped lobes of the fan. Due to these similar features and conditions, these fan-deltas could be used as future evidence for theories on Mars' paleoclimate transition from "warm and wet" to "cold and dry."