# Circular collapsed features related to the chaotic terrain formation on Mars

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Xanthe Terra region on Mars is known as a site of most drastic evolution related to the formations of huge chaotic terrain and multiple outflow channels. In this region, there are peculiar circular collapsed features. Some of them have cracked cavity or deep moat along the rim, others have plane blocks or knobby mounds. In several areas, these features are clustered to form a chaotic region, indicating they are the precursory unit of the chaotic terrains. Chaotic terrain has been interpreted as a site for the emanation of large amount of water [1,2]. Costard [3] interpreted the circular collapse as thermokarsts resulting from the magmatic heat degradation of the craters formed in the permafrost. But its relation to the formation of the chaotic terrain is not well clarified. Rodriguez [2004] proposed a model of chaotic terrain formation taking account of the role of crater cracking system as a groundwater pathway and the effectiveness of craters for the water collection. In his model, he treated the circular collapsed features incrementally, and he interpreted this feature as a degraded crater by the subsurface water activity.

In this study, we focus the circular collapsed features from the view of quantitative and statistic aspects, and examined their distributions and morphologies in Xanthe Terra region. We explore a model of its formation and give suggestions about the early stage of the chaotic terrain formation and the water discharge problems.

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