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First detection of Al-rich phyllosilicate on Mars from OMEGA-MEx

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Using OMEGA dataset, a small deposit of Al-rich phyllosilicate has been discovered on the floor of a crater located at 202.2E, 30.6S. The best spectral candidate is kaolinite, an aluminum silicate hydroxide (Al2Si2O5(OH)4). This detection is unique in the sense that the phyllosilicates detected on Mars by OMEGA so far included Mg and/or Fe rich ones, such as nontronite or montmorillonite (Poulet et al., this conf.). This detection is of particular interest because the formation of kaolinite indicates either the alteration of Ca/Mg-poor mafic rocks or the lost of mobile cations Ca2+ and Mg2+ resulting from the presence of abundant liquid water not only for leaching but also for reactions that consume H20 in the transformation of montmorillonite into kaolinite. HiRes imagery of this likely kaolinite-rich deposit is unfortunately poor, precluding us from studying detailed morphology. Nevertheless, Viking and THEMIS visible images indicate that this deposit shares several similarities with numerous phyllosilicate-rich terrains: medium albedo, rough texture, located in a noachian unit. The possible formation of this unique deposit will be discussed in the light of the formation processes of other phyllosilicates detected on Mars.