



The Martian North Polar Layered Deposits at High Resolution Using MRO HiRISE

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Visible layers within the martian north and south polar layered deposits (PLD) have been reviewed in several previous publications using Viking and MOC images. Since then, images from the MRO HiRISE camera are revealing unprecedented detail of polar layers which may be the most complete existing record of recent climate change on Mars. This first stage of our study is descriptive; later stages will delve into the possible processes which have created the various layer types and the climatic controls on layer deposition. In our preliminary analysis of one HiRISE image at 30 cm/pix resolution, we have thus far found that many layers which have previously been identified using MOC data appear as the topmost boundary of a package of thinner layers or as one layer but with more visible detail. For the most part, layer boundaries are not sharp at this scale. Additionally, HiRISE reveals layering down to the limit of its resolution (<1m thickness), possibly corresponding to a time span of a few 100 yrs per layer; but this thin layering appears only in confined places, not ubiquitously. Thus, even at high resolution, some layers appear as massive beds. We have also identified several sets of thin layers and several layers which are similar to the famous “Marker Bed” (previously thought to be unique) discovered in MOC images, possibly indicating repeating climate signals. One should keep in mind that without in-situ analysis, such as of drill core samples, we cannot see chemical or isotopic layering; and resolution limits and obscuration by frost and dust prevent us from seeing annual or decadal layer packages. Further analysis will include more images and the use of stereo data.