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CO_2 Ice state on Mars

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The Martian climate is mainly controlled by the condensation/sublimation of CO_2 representing 95% of the atmosphere. Recently, many surface features, including active geomorphological pattern, have been identified to be potentially linked to CO_2 exchange. Understanding the surface/atmosphere interactions is a major scientific issue, for both atmospheric but also surface science. The purpose of this work is to estimate the physical properties of the seasonal CO_2 ice deposits, that is the key to understand the interactions. Are these deposits granular or compact? What is the thickness of the ice? How much impurities are included within the ice? These questions have been highly debated in the literature, in particular the presence of a translucent slab ice, the link with the H_2O cycle. We use radiative transfer models to simulate spectroscopic data from the CRISM instrument and perform an inversion to estimate model's parameters though time. We then discuss the consistency of the results with other datasets. We found strong evidence of slab structure for CO_2 ice, and thus the detection of translucent ice.