

**VISUAL ANALYSIS OF SPATIOTEMPORAL VARIATIONS OF MARS ICE CLOUDS USING MARCI DATA.** K. Alshehhi<sup>1</sup> B. Alzahmi<sup>1</sup> A. Abuelgasim<sup>2</sup> <sup>1</sup>(Department of Physics, College of Science, United Arab Emirates University, Alain 15551, UAE, [201510533@uaeu.ac.ae](mailto:201510533@uaeu.ac.ae) and [201301991@uaeu.ac.ae](mailto:201301991@uaeu.ac.ae)), <sup>2</sup>(Geography and Urban Planning Department, College of Humanities and Social Sciences, United Arab Emirates University, Alain 1551, UAE, [a.abuelgasim@uaeu.ac.ae](mailto:a.abuelgasim@uaeu.ac.ae)).

**Introduction:** Water ice clouds are an essential component of the Martian atmosphere. The Martian atmosphere has water-ice clouds for most parts of the year covering different regions. They are of relevance for understanding the atmospheric thermal structure, chemical composition, and dynamics, and the planet's water cycle. Just to give a few examples, studies have suggested links between clouds and semi-diurnal atmospheric tides [1] and northern-hemisphere extratropical weather phenomena in the last years [2]. Likewise, transferring knowledge on today's clouds for studying the early Mars climate is of significant interest [3].

As part of an undergraduate student project, this study visually analyzes the spatiotemporal variations of water ice clouds over the Martian atmosphere. This visual analysis focuses on identifying the spatial distribution and frequency of water ice clouds for one Martian year using MARCI data.

The dataset used in this study consisted of daily MARCI visible data of one Martian year. The analysis procedure consisted of visual identification of ice clouds as visually observed. The data analysis consisted of two procedures, the first one focused on the manual digitization of observable ice clouds in each image in addition to identifying its geographical location within the planet (figure 1). Note that a month here is identified as approximately 16 degree of solar longitude.

The preliminary findings suggest that water ice clouds are found in both the northern and southern hemispheres of Mars with much more presence within the equatorial belt of Mars. Water ice clouds are much more pronounced in the northern hemisphere than the southern one. Furthermore, water ice clouds are much more frequent in the northern spring and southern summer than any other parts of the year.

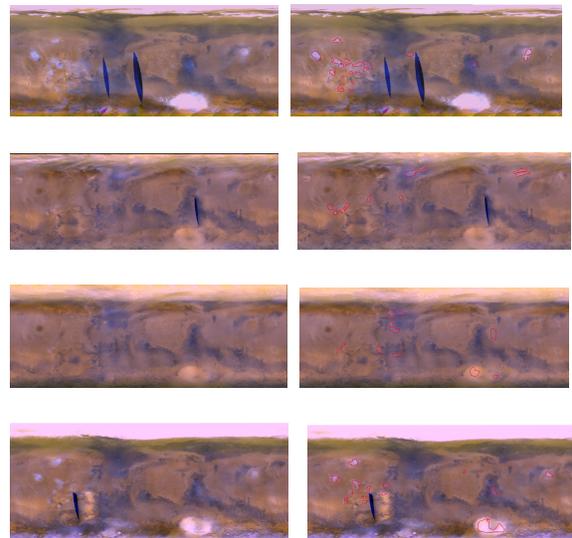


Figure 1: MARCI data with digitized ice clouds locations

## References

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- [2] Hollingsworth, J. L., Kahre, M. A., Haberle, R. M., Urata, R. A., and Montmessin, F.: Extratropical Weather Systems On Mars: Radiatively-Active Water Ice Cloud Effects, Paper presented at the 6th international workshop on the Mars atmosphere: modelling and observations, Granada, Spain, 17–20 January 2017.
- [3] Haberle, R. M., Clancy, R. T., Forget, F., Smith, M. D., Zurek, R. W. (eds) (2017) The atmosphere and climate of Mars. Cambridge University Press. <https://doi.org/10.1017/9781139060172>