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Exploring "Freeze Out" on Mars using an Atmospheric Circulation Model MICHAEL ESQUIVEL — In addition to observational research, computational models like the NASA Ames Mars General Circulation Model (GCM) are used for efficient and often detailed representations of physical quantities. Using this GCM model, I am studying the effects of the distribution and density of frozen carbon-dioxide located at the polar caps. I have paid attention to the effects of the resulting ground temperature, surface pressure, and ground ice through time-based 2D and 3D animations. Also, I have modified the planet's axis between 5 and 50 degrees, changed the pressure by orders of magnitude from zero to two magnitudes, and studied conditions that result to a time frame of nearly 4 billion years ago. Preliminary results show that low pressures with low degrees of tilt have resulting pressures that approach zero, often ending simulations early. The remaining frozen carbon-dioxide remains airborne which could explain the possibility of an atmospheric phenomenon called a "freeze out." This type of atmospheric computational data is often tedious and cumbersome to interface between numerical data and visual format. To counteract this problem, I have built an interface using IDL to interact with raw Mars GCM data. This interface allows researchers to increase the time to study actual science and minimize the time to find and decipher data to a visual format. This interface allows modification of initial variables to allow for cold starts of the Mars GCM model as well as create new maps and view them in an animation sequence to study changes in time.

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