# Surface Snow Modeling at Dome C, Antarctica

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Modeling effectively surface snow compaction in Antarctica is of great interest for a better understanding of exchange processes between the snow surface and the atmosphere as well as their relevance to surface mass balance. At Dome C, we measured water equivalent of solid precipitation collected about 0.8 m above the snow surface. The density of this collected snow varies roughly from 50 to 300 kg $m^{-3}$ with a mean around 80 kg $m^{-3}$. On the other hand, the measured density over the top 10 cm of the snow cover being about 300 kg $m^{-3}$, this layer roughly represents the mean yearly accumulation at Dome C, for which detailed snow profiles, continuous records of snow temperatures, and a one year meteorological data set are available. There are no particular observations of drifting snow but we expect wind to play a major role in this densification process. Extensive qualitative descriptions of the snow deposition process exist in literature but no detailed quantitative study. Adjusting its settings to the extreme Antarctic climate, we use SNOWPACK, a flexible, modular snow cover model to simulate snow cover evolution. We explore different mechanisms that could lead to the apparent rapid densification of Antarctic surface snow such as wind action based on the current understanding of drifting snow or the influence of water vapor deposition and sublimation at the surface, for example. We will discuss implications from our results for future studies with respect to both modeling and in situ measurements relating to this very important process.

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