

Depth-age and annual layer-thickness scales for Siple Dome, West Antarctica: measurements versus predictions from ice-flow modeling

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The observed depth-age scale and internal layer shapes from Siple Dome are compared to predictions from a new, thermo-mechanical flowline model. The model solves the full, 2-dimensional momentum and heat balance equations in orthogonal, curvilinear coordinates, using the finite volume method. Evolution of the free surface and internal layer shapes are accounted for explicitly, according to the calculated, transient velocity fields.

When driven solely by climate forcing representative of the past ~120 ka, the modeled depth-age scale is, in general, too young. We experiment to find various ice thickness and divide-flow histories that bring the modeled and measured scales into closer agreement. The best fitting models and their interpretation with respect to the deglaciation history of the WAIS are discussed in a related, oral presentation (same authors, this conference).