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## Tracking climate-induced glacial changes

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The plot in *The Day After Tomorrow*, a futuristic movie about the devastating ecological and climatic impacts of global warming, may not hold much water to Gwenn Flowers because of inaccuracies. But Simon Fraser University's newest faculty member in earth sciences says seeing a colossal tidal wave engulf New York City and the world transform into an glacial graveyard does achieve one important thing. "It gets people thinking about the societal problems imposed by climate change and the political obstacles to preparing for and mitigating them," says the recently appointed Canada Research Chair in glaciology.

Flowers is trying to understand how, and the rate at which, glaciers and icecaps respond to global warming and other climate changes. "The climate system is nonlinear, which means that what you get out of it is not proportional to what you put in," explains Flowers, whose undergraduate work was in physics. "It also has thresholds, meaning that in some respects the system can be pushed and pushed without showing a response until suddenly it changes state. As one scientist says: 'The climate system is an angry beast, and we are poking at it with sticks.

' " Flowers' field research in Iceland has given her a close-up view of how glacier thinning can lead to the loss of water resources and disrupt outburst flood cycles. In collaboration with scientists in earth sciences at the University of British Columbia, where she last worked, Flowers has developed multi-layered computer models. They analyse the interaction of ice geometry, dynamics and hydrology (water movement) of glaciers in response to climate change. The scientists have discovered that, "after direct changes in climate -- precipitation and temperature for our purposes -- hydrology appears to be next in order of importance for controlling the geometry and dynamics of ice caps we have studied," says Flowers. These dynamics make ice caps more sensitive to climate change.

Flowers' Canada Research Chair is allowing her to return to the site of her doctoral research, the St. Elias Mountains of the Yukon. There, she will use various data, including ancient records of past climates, to study the variability of glacial change in neighbouring mountain ranges with different microclimates. Eventually these studies will include alpine glaciers in BC.