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The Arctic - the key to understand global changes

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Proper understanding of recent climate changes requires knowledge about past climate variations in the Earth's system. Particularly valuable is documentation of changes in key areas, like the high northern latitudes of the Atlantic Ocean that are currently exposed to the largest environmental changes. Those changes are especially pronounced in frontal areas, e.g., the region off the west coast of Spitsbergen (European Arctic), where an oceanic polar front forms between relatively warm and saline Atlantic Water and colder and fresher Arctic Water. The lecture presents an overview of recent studies on ongoing environmental changes, their history as well as the challenges generated by them. The changes include fluctuations of glacier fronts, sediment budget variations, oceanic circulation changes and permafrost thawing. Their history is reconstructed from geological archives applying range of proxies from simple ice rafted debris counting to analyses of ancient foraminiferal DNA. Among the future challenges are problems of new and more frequent hazards, e.g. iceberg-roll and landslide-generated tsunamis.

