The younger dryas essay sample

Environment, Climate

The Younger Dryas was an extremely rapid climate change that occurred during the last deglaciation of the North Atlantic region, Greenland, the West Coast of Canada, and also in the Southern Hemisphere . Ice core studies have focused on the abrupt termination of this event because this change was the end of the last major climate reorganization during the deglaciation. The Younger Dryas also challenge the former belief that climate changes were always gradual. Previously, scientist believed that thermal inertia of the ice sheets was great enough to deter any significant rapid changes, but due to this event, we are now aware that rapid climatic changes are possible (Broecker, 1988).

The Younger Dryas occurred approximately 12800 years before present (BP) when the earth's temperature dropped approximately 7 ^{o}C within a 20 year period and then ended just as quickly with a 7 ^{o}C increase 700 years later. The Younger Dryas led to enormous but short-lived changes in the climate of Northern Europe.

Variances were first noted in pollen records, indicating a transformation from forests to herbaceous plants and then back to forests again. It was named because of the dominance of pollen from an arctic wildfower named *Dryas octopetella* that was found in Scandinavia. This wildflower started to show up with Arctic shrubs and grasses as the forests gave way when near glacial conditions began (Mattews, 1993).

Several scenarios for the cause of the Younger Dryas have been proposed. Hypotheses have been made suggesting that the onset of the Younger Dryas marks a major influx of tabular icebergs from a disintegrating Arctic ice shelf.

Others have suggested that it was due to shifts in the wind patterns in response to the retreat of the ice sheets. But neither of these ideas explain how such a large change in regional climate could be so quickly initiated and quickly terminated (Broecker, 1988).

Wallace Broecker believes that these changes in climate are triggered by a collapse of what he refers to as the “ Conveyor Belt”. The rapid retreat of ice gives way to warm, salty water which loses its heat as it flows northward. It then sinks and starts the conveyor. As the conveyor transported more and more heat to the north, it accelerated the retreat of the ice. This is called thermohaline circulation, which means driven primarily by heat (therme) and salt (hals). Solar heat spreads from the tropics to the high latitudes and transports salt. As it goes from saline to non-saline, the amount of heat it transports changes (Broecker, 1988) (Kunzig, 1996).

Further documentation of the occurrence of the Younger Dryas has been made by measuring the changes in electrical conductivity of Greenland Ice Sheets (GISP2). These studies have revealed rapid changes in the dust content of the atmosphere during the same periods and throughout the last glacial Holocene climates are by comparison stable and warm.

High resolution continuous measurements of GISP2 major anions (chloride, sulfate and nitrate) and cations (sodium, magnesium, potassium, calcium and ammonium) were used to reconstruct the paleo environment during the Younger Dyas (Mattews et al., 1993c). These chemical records provide an indicator of the changes in the characteristics of the sources of these soluble

components or changes in their transport paths, in response to climate change.

Research continues into the probable cause of the Younger Dryas. As the climate of our world changes, our concerns mount. Understanding this historic period and the causes of such a rapid climatic change may help us to understand changes in our future world and possibly lessen their effects on the eco system.

Broecker, W. S., Andree, M., Wolfli, W., Oeschger, H., Bonani, G., Kennett, J. and Peteet, D., 1988. The chronology of the last deglaciation: Implications to the cause of theYounger Dryas Event. Paleoceonography 3: 1-19.

Kunzig, R. 1996. In Deep Water. Discover Dec. 1996: 86-96.

Mattews, R. W., L. E. Heusser and R. T. Patterson. 1993. Evidence for Younger Dryas-age cooling on the North Pacific Coast of America. Quaternary Science Reviews 12: 321-331.