



SPQ Module 15 - Water, Water Everywhere



In order to run or ski 1130 kilometers one of the most essential factors is proper hydration. Human beings are composed of 60% water. Any imbalance in the water content of the body can be very dangerous. Dehydration, usually secondary to diarrhea, is one of the leading causes of mortality in children worldwide.

Athletes involved in high intensity exercise will lose water more rapidly, even in cold environments. Although Ray, Richard and Kevin will be running and skiing on top of about 30 million cubic kilometers of water none of it is readily available to drink. In other words, unless you have a means of melting snow or ice in

Did You Know?

Different people have different percentages of water content in their body depending on:

- Age (babies are about 78% water at birth)
- Obesity (Fat tissue does not hold as much water)
- Sex (Men have a higher percent water content than women)

Antarctica, which holds about 70% of the world's fresh water reserves, it can be virtually impossible to locate drinkable water. This ultimately proved a problem for Scott and his men because they ran out of fuel toward the end of their journey. The principle function of the fuel was to melt snow for water. Dehydration is thought to have contributed to their ultimate demise.

The sole reason Ray, Richard and Kevin will be carrying fuel is to melt snow for water. This will be the only non-renewable source of energy they use on the expedition. The snow they melt will be used to hydrate food in camp, and to heat drinking water that they will carry with them. The reason they will carry hot water to drink is that cold water will rapidly freeze in a water bottle when traveling in marked sub zero conditions.



Figure 1: The Antarctic Ice Cap. Ray, Richard and Kevin will be traveling over kilometer upon kilometer of frozen water like this (Photo: Stephen Hudson).

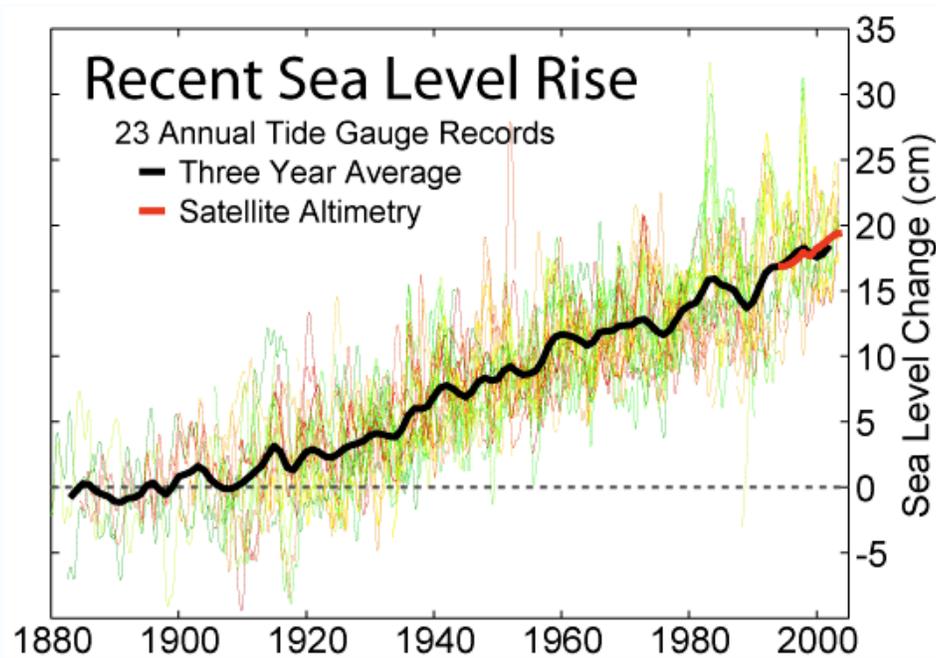
Dehydration in its mildest form can cause extreme thirst, muscle cramps, weakness and a stomachache. People with mild dehydration are unable to continue exerting themselves and it can take hours for the body's water and salt balance to return to normal. In its most severe form, dehydration can precipitate loss of consciousness, rapid heartbeat and breathing, low blood pressure and death. If someone has dehydration in a remote location like Antarctica with no access to intravenous fluids, rapid administration of water by mouth is necessary. Water alone is not as well absorbed by the intestine, as is a mixture of water, salt and sugar. The salt and sugar help water cross more rapidly into the bloodstream. It is based on this principle that sport drink formulas include specific quantities of water, salt and sugar.

Although Antarctica holds a majority of the world's water, bound in ice, the continent is by definition a desert. In fact, Antarctica is the world's largest and driest desert, surpassing even the Sahara. The accepted definition of a desert is an area of low precipitation and high evaporation that receives less than 10 inches of annual precipitation.

There are many very dry regions in the world, and with the growth of human population fresh water has become an ever more precious commodity. Dating back thirty years the suggestion was being made that water impoverished areas of the world could benefit from water trapped in icebergs. Towing huge bergs from Antarctic waters to countries in need could provide a ready remedy for water shortages. Antarctica produces about 2,000 cubic kilometers of icebergs a year composed of crystal clear drinkable water.

To many people this idea is problematic. The energy it would take to tow large icebergs to water starved regions of the world would serve to hasten global warming, further destabilizing the climate and promoting the melting of the

Antarctic Ice Cap. Some scientists warn that accelerated melting of the Antarctic Ice Cap could lead to precipitous increases in sea level, predicting that by 2100 the sea may have risen by as much as thirty feet. A rise in sea level of even 10 feet would be devastating to many coastal communities.



Source: Robert A. Rohde, the global warming art project.

However there is much debate about whether the East Antarctic Ice Cap is actually melting. An ice cap grows with the addition of snow and shrinks through melting and evaporation. It is agreed that sea levels have been rising steadily for many years and that the rate seems to be accelerating. It is also widely held that the Antarctic Ice Cap reached its peak about 20,000 years ago and has been losing mass ever since. According to estimates, the oceans have risen by about 10 meters during the same time frame. The debate lies with what is happening today. There is conflicting evidence about whether the sum of Antarctic ice is actually growing or diminishing, making predictions about future sea level changes difficult. If the entire Antarctic Ice cap were to melt it would raise the world's oceans by 60 meters. Given the size of the ice cap don't expect that to be happening any time soon!

Did You Know?

Penguins can drink seawater without getting sick. They can do this because they have special glands that secrete excess salt from their bodies. When on land they eat lots of snow to make up for a scarcity of running water.