

# EXPERIMENTS TO GAIN INSIGHT ON LIMESTONE DEPOSITION IN PRECAMBRIAN

## STATEMENT OF THE PROBLEM:

There are thick deposits of limestone and dolomite in the Precambrian era that was laid down during a time in Earth history when our planet experienced globally cold temperatures to the point of possibly freezing the entire globe into what has been termed "Snowball Earth". Limestones and dolomites are typically interpreted as warm water deposits and are thought to be derived from invertebrate animal activity (coral and mollusk reef builders). However, limestone reef builder invertebrate animals did not evolve until after the Precambrian.

Does freezing seawater perhaps concentrate  $\text{Ca}^+$  cations and  $\text{CO}_3^-$  ions so that more limestone ( $\text{CaCO}_3$ ) precipitates from the unfrozen solute than what precipitates from seawater which had not undergone freezing?

## GATHER INFORMATION:

Perform an internet search using "Precambrian snowball earth" as the search phrase to learn more about the glacial periods at the end of the Precambrian.

## HYPOTHESIS:

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## PROCEDURE:

Collect 3 gallons of seawater.

Measure 2,000 ml of seawater into an ice cream bucket and freeze to half its depth.

Take 400 ml of unfrozen seawater and evaporate off 200 ml then run through a cloth to catch  $\text{CaCO}_3$  crystals. Find mass of collected amount.

Take 400 ml of frozen seawater and evaporate off 200 ml then run through a cloth to catch  $\text{CaCO}_3$  crystals. Find mass of collected amount.

As a control take 400 ml of seawater that has not been frozen and evaporate 200 ml then catch CaCO<sub>3</sub> crystals. Find mass of collected amount.

**NOTES:**

See experiments in previous links <http://www.coski.vcmsteacher.org/Webpage/6-SciProject-Fair/1112/LimestoneResearch-1112.htm>

to modify the experimental procedure and improve accuracy as you see fit.