The Effect of Climatic Change on the Bioluminescence of Dinoflagellates (Pyrocystis fusiformis).

Connolly, Cameron

This project was undertaken to examine how climatic change may affect the bioluminescence of dinoflagellates. In a world where both global cooling and warming cycles are imminent, it is essential to observe how changes in this factor affects Pyrocystis fusiformis, a keystone species. The emission of light in these organisms, bioluminescence, is a result of a chemical reaction in the internal structure of the dinoflagellate cell. It has been found through past experiments that dinoflagellates are affected by environmental factors including changes in humic acid levels, copper sulfate concentration, and circadian rhythm alterations. Changes in climatic temperature on dinoflagellate bioluminescence is a topic that has not been researched very much. This investigation was constructed to observe whether changes in temperature do indeed have an impact on dinoflagellate bioluminescence. The investigation was conducted over a two and a half month period with five levels of temperature used: 13°C, 18°C, 23°C, 28°C, and 33°C. Bioluminescent output was quantifiably measured using a handmade photo-voltaic converting chamber. This chamber is able to successfully convert emitted photons into measurable electrical energy. At thirty-three degrees Celsius, the bioluminescence of dinoflagellates was measured as high as thirty-three and one tenth millivolts, which is well above natural habitat level output. Global warming would have a clear impact on dinoflagellates, rapidly increasing their bioluminescence at first, but denaturing them within several days. The dominance of dinoflagellates, specifically Pyrocystis fusiformis, would justifiably decrease over time in the presence of global warming if adaptions were not made quickly.