Summary of Meeting with Dr. Field

Dr. Leslie Field is the founder of the nonprofit organization, Arctic Ice Project (formerly known as Ice911 Research). She and her team have done groundbreaking research studying ways to protect the albedo of young ice in the Arctic. They have proposed to spread a thin layer of hollow, environmentally friendly silica-glass microsphere (HGM) beads across the arctic ice. These HGM beads can increase ice albedo, slow ice melt, and have shown the potential to enable young ice in the arctic to grow. I had the amazing opportunity to sit down with her and ask her some questions about her research.

It was really interesting to hear how their experiments developed-it started as a complete volunteer effort where they had to be really resourceful. Their first test site was a pond in one of their volunteer's backyard. They mounted an albedometer (a device that measures the albedo/reflectivity of ice) on pulley systems to measure the difference in reflectivities with and without the silica beads. Recently, they have worked with some climate modelers to see the possible impact on climate if they were to treat part of the Fram Strait; in an area of approximately 1% of the Arctic. A significant amount of ice has flowed through the Fram Strait. The modeling shows that the HGMs could thicken young ice locally, as well as in some areas outside of the modeled treatment by affecting some Arctic circulation patterns in a favorable way. This allows the ice and clouds in the region to reject more incoming solar radiation from the surface and the top of the atmosphere. The percentages of reflectivity were quite significant. This is only the first time they run this detailed model for the Fram Strait, and they intend to continue the modeling work for the Fram Strait, and elsewhere.

"In theory, there is no difference between theory and practice, but in practice, there is." Dr. Field wants to make sure that there are no unintended consequences of their research. They

are partnering up with Norwegian marine biologists to test the more subtle effects of the silica beads. While the materials of the silica beads should not have any drastic impacts since they are made from silica and oxygen (which are both incredibly abundant on Earth), they want to make sure that it does not cause any imbalance in the ecosystems. They have tested the effect of many different things on how it protected ice. At the beginning of her experiments, Dr. Field tried a number of different things like white and black sheets, plastic bags, and hay on top of small test tanks on Dr. Field's deck at home, to test whether her theories were accurate.

Implemented in the Arctic, the silica beads would likely come into contact with many different types of wildlife. They have taken many precautions to ensure that the silica beads will not harm the ecosystem. They are amorphous, meaning they do not contain potentially hazardous crystalline materials. They are also above a 10-micron diameter so that they can't be inhaled. Additionally, Dr. Field selected the silica beads were hydrophilic in order to not attract oil-based pollutants; if animals were to eat them, they would not be poisoned. They have had an outside testing lab feed large quantities of silica beads to a small test group of fish. A small number of the fish lost their appetite for a couple of days after eating the silica beads, but there were no casualties or other effects seen due to ingestion.

It was a pleasure to hear about Dr. Field's research with albedo and sea ice. This year I did my science experiment, where I tested the effect of different additives on the melting of ice, based on her work. Dr. Field will be sharing the write-up of my experiment at the 3rd Annual Youth Climate Action Summit, a conference centered around climate change and what teens can do to fight it. This is a really interesting topic, and I intend to follow the Arctic Ice Project's research. Dr. Field hopes to finish testing this experiment in the next five years. With climate change becoming a growing concern, their work could be a vital solution to mitigating its effects.