

## Can We Destroy Hurricanes Before They Come?

Hurricane strikes have caused tremendous damage to the United States, both socially and financially. Is there a way to prevent a hurricane from making landfall, completely dissipate the entire hurricane, or at least weaken its intensity? It may seem like something out of science fiction, but U.S. government agencies did initiate projects attempting to achieve such goals. Before introducing the projects, we should know about theories of how to weaken hurricanes.

Hurricanes require huge amounts of energy. They acquire energy from the liberation of heat from water in the hydrologic cycle. If the liquid cloud condensation can convert into ice, then this should weaken hurricanes. However, clouds around the eyes of hurricanes exist in a **supercooled state**, which means that “the ‘liquid droplet’ temperature is below freezing (32°F), but the liquid lacks a ‘triggering’ mechanism to turn to ice.” Scientists have proposed a method in which artificial ice nuclei (silver iodide) can be introduced into a super-cooled cloud. As a result, the water will convert to ice and release a lot of heat causing the cloud to grow. The ultimate goal is to grow the clouds at the outer eyewall, thus, replacing the inner eyewall. Such a strategy will reduce the wind speed of a hurricane. This process is called **cloud seeding**.

The first project, known as *Project Cirrus*, was carried out on October 13, 1947. In this project, a plane introduced silver iodide into the hurricane. There were changes in the appearance of the clouds and the structure and intensity of the hurricane, but overall, the hurricane remained unchanged. It was later proved that it was very unlikely to change the path of a hurricane by cloud seeding since their velocities are guided by large-scale atmospheric currents. The next experiment was attempted on September 16, 1961. A naval aircraft dropped silver iodide into Hurricane Esther. Esther did stop intensifying after the seeding. The next day, however, the silver iodide was not dropped properly and Esther’s intensity did not change. Later, it was revealed that “the eyewall-seeding hypothesis was flawed and that Esther’s changes must have occurred naturally.”

The second project, known as STORMFURY, was initiated in 1962. Silver iodide was seeded at Hurricane Beulah’s eyewall in August, 1963. There was a disintegration of the eyewall but a new eyewall also formed. There was also a 20 percent decrease in maximum wind speed. Another attempt was carried on Hurricane Debbie on August 18, 1969. There was a 31 percent decrease in wind speed afterwards. Unfortunately, the project was stopped due to the inactive hurricane season in 1970s. Later, Central American countries began restricting cloud seeding and aircrafts became outdated for such missions. In 1983, Project STORMFURY was terminated.

After years of research, it was found that eyewall replacement occurred naturally and is associated with temporary weakening. This process is called **concentric eyewall cycle** and lasts from 12 to 36 hours. Hurricane intensity is mainly controlled by external influences, such as water temperature and wind shear.

*Sources:* Fitzpatrick, P. J. 1999. *Natural disasters: a reference handbook*. Santa Barbara: ABC-CLIO, Inc. pp.44-48.