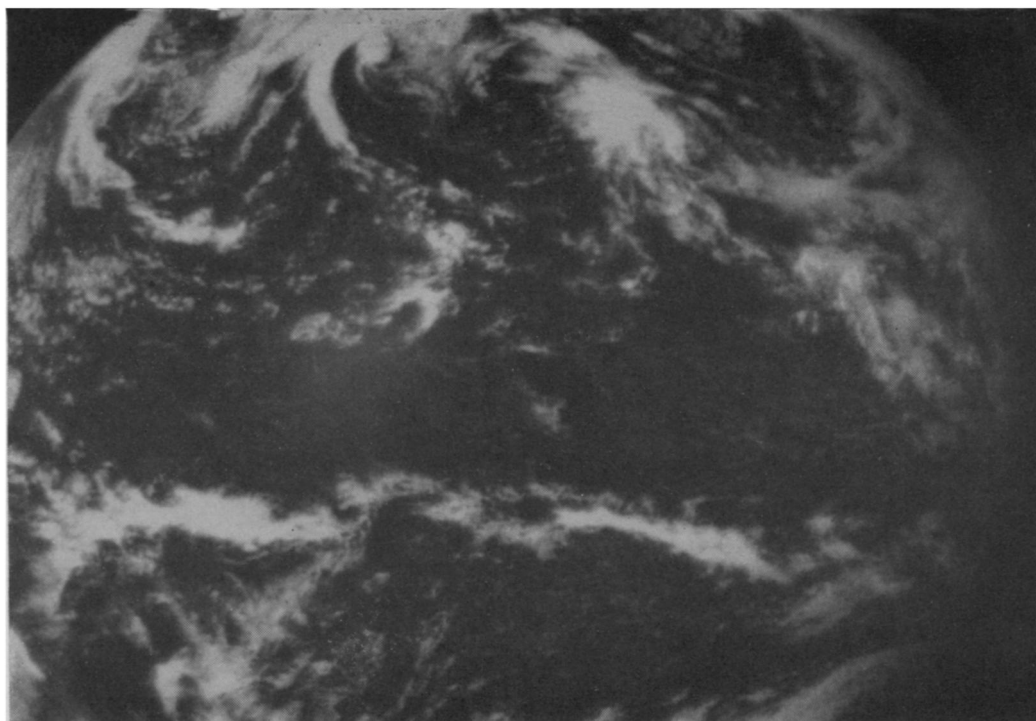


Closing the Weather Gap



NASA
A satellite view of the equatorial trough in mid-Pacific.

Meteorologists head for mid-Pacific atolls in the first all-out study of tropical weather.

The first large-scale attempt to learn the workings of tropical weather in the Pacific Ocean has made tent cities of three remote atolls about 1,200 miles southwest of Hawaii.

The Line Islands Experiment, named for the atolls, is aimed squarely at ending this glaring gap in meteorological knowledge. It has brought some 75 scientists to the atolls for two months of unrelenting weather-watching.

The equatorial trough zone, the prime subject of scrutiny, is known to be the area from which tremendous amounts of energy are somehow channeled through the atmosphere to the earth's middle latitudes.

A study of its features was singled out for attention in the Experiment plan submitted to the National Center for Atmospheric Research in Boulder, Colo., which is sponsoring the work.

And the best place to do this, the report noted, is from the atolls—Palmyra, Fanning and Christmas Islands—which are directly under the trough.

A principal feature of the Line Islands Experiment is the attempt to correlate extensive ground-based observations with features observable on photographs taken by the Applications Technology Satellite which hovers 22,300 miles overhead.

If cloud formations sighted by the satellite can be successfully linked to specific weather conditions on the surface, that knowledge can be used to

make future local and global weather predictions based on the satellite pictures.

In many of the ATS-1 pictures the equatorial trough seems to appear as a region outlined by long, stringy cloud formations running east and west across the Pacific, between Hawaii and the Line Islands.

In addition to the satellite and ground observations, data will be collected by the Coast and Geodetic Survey ship Surveyor I and by two airplanes.

All this, according to the scientific plan, will provide a base for the Tropical Meteorology Experiment, a part of the Global Atmospheric Research Program scheduled to begin in 1972. Hopefully, the Global Program will close the gaps in the World Weather Watch—and eventually permit two-week worldwide forecasts.

A measure of the work to be done can be taken from the eleventh scientific hypothesis proposed for study in the LIE plan: "That the apparent cloud vortices which occasionally move westward (north of the equatorial trough zone) . . . are, in fact, actual wind circulations."

In all, the planning group identified 17 hypotheses to be tested in the course of the Line Islands work. Most, like the eleventh, reveal the woeful state of meteorological knowledge about the region.

- Local weather around the atolls

will be studied, along with the effect the islands have on it, if any. This has a direct bearing on the accuracy of weather observations made from the islands.

- Complete photographic sky coverage will be obtained hourly, recording rain gauges established on each atoll and low-level aircraft flights made.

- A key study will be of convection mechanisms that may carry large amounts of energy into the troposphere where, presumably it is transferred to other latitudes.

- Another key question concerns the day-to-day behavior of the equatorial trough zone itself—whether it moves north or south and, if so, how far. To date, analysis of its behavior has depended on satellite pictures without accompanying ground observations. These have shown variations in the clouds associated with the trough and seem to indicate that the trough is quite stable in its location.

- The experiment will also seek to link small scale cloud systems with specific wind and heat flow conditions and, perhaps, show that the relationship is dependent on the length of time the particular cloud system has been in existence. The LIE is expected to provide data on this for the first time in the equatorial trough zone.

The Line Islands Experiment ends in mid-April, but analysis of the data will continue well beyond that.