

METEOROLOGICAL NOTE No. 29

ARE THUNDERSTORMS AROUND ISOLATED ISLAND STATIONS IN THE PHILIPPINES FRONTAL?

By Rev. C. E. DEPPERMAN, S. J.

Assistant Director, Philippine Weather Bureau

In the Philippine Weather Bureau Meteorological Bulletin for 1931, Fr. Selga, Director of our Bureau, proves from our statistical data that Basco, situated between northern Luzon and Formosa (Lat. $20^{\circ} 28' N.$, Long. $121^{\circ} 59' E.$), has remarkably fewer thunderstorms than Manila. He thus corroborates the statement of Rev. Anastasio Idigoras, O. P., a missionary of long residence in the Batanes. In explanation, Fr. Selga attributes the scarcity of thunderstorms around Basco to the lack of facilities for rapid vertical convection of humid air on the insignificant islands of the Batanes group. This is quite true, but the question naturally springs up, whence the thunderstorms that do actually arise? It occurred to the writer that since they could not easily be attributed to convection over heated land they should be mainly frontal. With this in view an examination was made of the records of Basco for the years 1930 to 1935, inclusive.

Basco is especially apt for such an investigation, since it is on a small island only about 15 kilometers long and but 5 kilometers or less wide; it is, however, rather hilly, with some elevations about 1,000 meters high to the north of the town, and some 400 meters high, off to the south. Since the extent of the hills is so small, it seems very probable that they are not the cause of much convection, the winds having ample opportunity to bend around them. Another favorable circumstance is that Basco is about 175 kilometers from the southern tip of Formosa, and about 200 kilometers away from the end of northern Luzon. Assuming very good visibility, not so probable in conditions favorable for heat thunderstorms, Basco could not behold distant lightning from Formosa and Luzon unless the lightning was over 2 miles above sea level. (The very convenient formula $D = \sqrt{3/2h}$, D in miles, h in feet, approximately, is here used). We can therefore assume, when our observer records only lightning seen, and no thunder heard, that the majority of these lightnings indicate storms at sea and *not* the heated conditions on extended landed areas. However, the possibility is by no means excluded; and it is for this reason that in some of the investigations recorded below a distinction is made between cases where thunder was heard (hence definitely a storm in the immediate neighborhood), and when only lightning is recorded.

Two other of our island stations will also be briefly examined, i. e., Cuyo and Jolo, which, although not so favorably situated as Basco, still offer some points of interesting comparison. Cuyo (Lat. $10^{\circ} 51' N.$, Long. $121^{\circ} 01' E.$) is a small, flat island about 12 kilometers long and some six or seven kilometers wide, situated in the northern part of the Sulu Sea, about 115 kilometers west of Panay and 150 kilometers east of the northern end of Palawan. Jolo ($6^{\circ} 03' N.$ Lat., Long. $121^{\circ} 00' E.$) is situated near the western end of an island about 62 kilometers long (east to west) and about 15 to 20 kilometers wide. Borneo is about 175 kilometers to the west-southwest and Mindanao some 100 kilometers or less to the northeast of Jolo. From south to east the town of Jolo is rather shielded because of a row of hills which in places rise to a height of some 800 me-