= Central dense overcast =

The central dense overcast , or CDO , of a tropical cyclone or strong subtropical cyclone is the large central area of thunderstorms surrounding its circulation center , caused by the formation of its eye wall . It can be round , angular , oval , or irregular in shape . This feature shows up in tropical cyclones of tropical storm or hurricane strength . How far the center is embedded within the CDO , and the temperature difference between the cloud tops within the CDO and the cyclone 's eye , can help determine a tropical cyclone 's intensity . Locating the center within the CDO can be a problem for strong tropical storms and with systems of minimal hurricane strength as its location can be obscured by the CDO 's high cloud canopy . This center location problem can be resolved through the use of microwave satellite imagery .

After a cyclone reaches hurricane intensity , an eye appears at the center of the CDO , defining its center of low pressure and its cyclonic wind field . Tropical cyclones with changing intensity have more lightning within their CDO than steady state storms . Tracking cloud features within the CDO , using frequently updated satellite imagery , can also be used to determine its intensity . The highest maximum sustained winds within a tropical cyclone , as well as its heaviest rainfall , are usually located under the coldest cloud tops in the CDO .

= = Characteristics = =

It is a large region of thunderstorms surrounding the center of stronger tropical and subtropical cyclones which shows up brightly (with cold cloud tops) on satellite imagery . The CDO forms due to the development of an eyewall within a tropical cyclone . Its shape can be round , oval , angular , or irregular . Its development can be preceded by a narrow , dense , C @-@ shaped convective band . Early in its development , the CDO is often angular or oval in shape , which rounds out , increases in size , and appears more smooth as a tropical cyclone intensifies . Rounder CDO shapes occur in environments with low levels of vertical wind shear .

The strongest winds within tropical cyclones tend to be located under the deepest convection within the CDO , which is seen on satellite imagery as the coldest cloud tops . The radius of maximum wind is usually collocated with the coldest cloud tops within the CDO , which is also the area where a tropical cyclone 's rainfall reaches its maximum intensity . For mature tropical cyclones that are steady state , the CDO contains nearly no lightning activity , though lightning is more common within weaker tropical cyclones and for systems fluctuating in intensity .

= = Eye = =

The eye is a region of mostly calm weather at the center of the CDO of strong tropical cyclones . The eye of a storm is a roughly circular area , typically 30 ? 65 km (20 ? 40 miles) in diameter . It is surrounded by the eyewall , a ring of towering thunderstorms surrounding its center of circulation . The cyclone 's lowest barometric pressure occurs in the eye , and can be as much as 15 % lower than the atmospheric pressure outside the storm . In weaker tropical cyclones , the eye is less well @-@ defined , and can be covered by high cloudiness caused by cirrus cloud outflow from the surrounding central dense overcast .

= = Use as a tropical cyclone strength indicator = =

Within the Dvorak satellite strength estimate for tropical cyclones , there are several visual patterns that a cyclone may take on which define the upper and lower bounds on its intensity . The central dense overcast (CDO) pattern is one of those patterns . The central dense overcast utilizes the size of the CDO . The CDO pattern intensities start at T2.5 , equivalent to minimal tropical storm intensity , 40 mph (64 km / h) . The shape of the central dense overcast is also considered . The farther the center is tucked into the CDO , the stronger it is deemed . Banding features can be utilized to objectively determine the tropical cyclone 's center , using a ten degree logarithmic spiral .

Using the 85 ? 92 GHz channels of polar @-@ orbiting microwave satellite imagery can definitively locate the center within the CDO .

Tropical cyclones with maximum sustained winds between 65 mph (105 km / h) and 100 mph (160 km / h) can have their center of circulations obscured by cloudiness within visible and infrared satellite imagery , which makes diagnosis of their intensity a challenge . Winds within tropical cyclones can also be estimated by tracking features within the CDO using rapid scan geostationary satellite imagery , whose pictures are taken minutes apart rather than every half @-@ hour .