CHANGES TO THE TAFB PORTION OF THE UNIFIED SURFACE ANALYSIS

Beginning 1 June 2011, the Tropical Analysis and Forecast Branch (TAFB) will officially include, as part of its portion of the unified surface analyses (USA), a distinction between the trade wind Intertropical Convergence Zone (hereafter ITCZ) and the monsoon trough ITCZ (hereafter monsoon trough). A second addition to the TAFB portion of the USA will be the depiction of shear lines.

Depiction of the Monsoon Trough on the TAFB portion of the Unified Surface Analysis

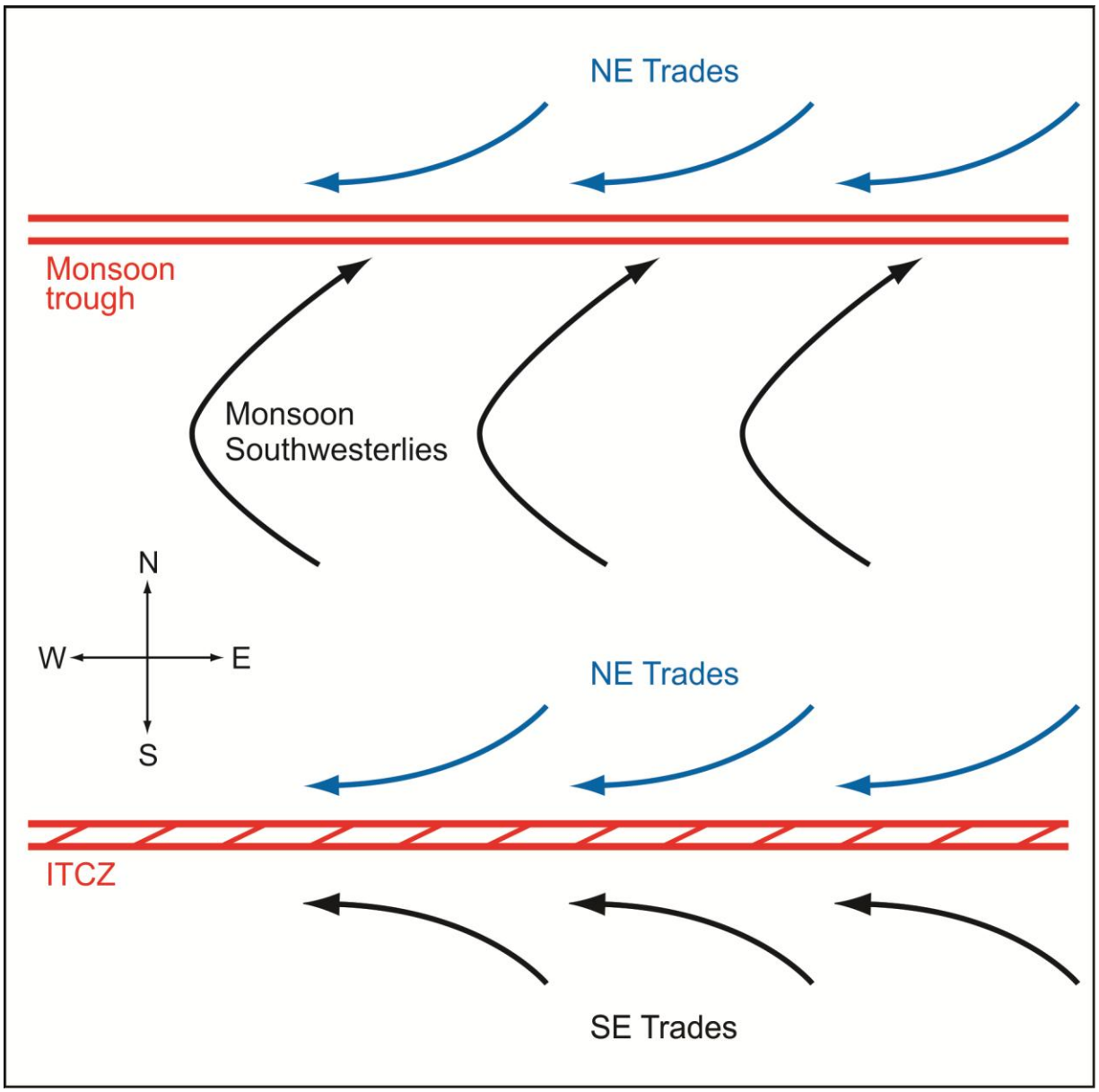
The decision to differentiate between the ITCZ and monsoon trough arises from the differences in wind direction and its' implication for tropical cyclogenesis for each feature. TAFB's definition of each feature follows:

ITCZ - a zonally elongated axis of surface wind confluence of northeasterly (NE) and southeasterly (SE) trade winds in the tropics.

Monsoon Trough - the portion of the ITCZ which extends into or through a monsoon circulation, as depicted by a line on a weather map showing the location of minimum sea level pressure. This line coincides with the maximum cyclonic curvature vorticity, with southwesterly (SW) monsoonal flow prevailing south of the trough axis.

Implication for users of the TAFB surface analysis: users may anticipate SW winds to the south of the monsoon trough, and SE winds to the south of the ITCZ.

Implication for tropical cyclogenesis: the convergence of SW winds south of the monsoon trough and NE winds north of the monsoon trough creates a background flow that produces cyclonic vorticity, which is important for tropical cyclogenesis. The ITCZ creates a confluence zone of NE trade wind flow and SE trade wind flow, which does not readily create cyclonic vorticity. Thus, tropical cyclogenesis is more likely in a background flow associated with a monsoon trough than the ITCZ. Please see figure below for examples of each situation.

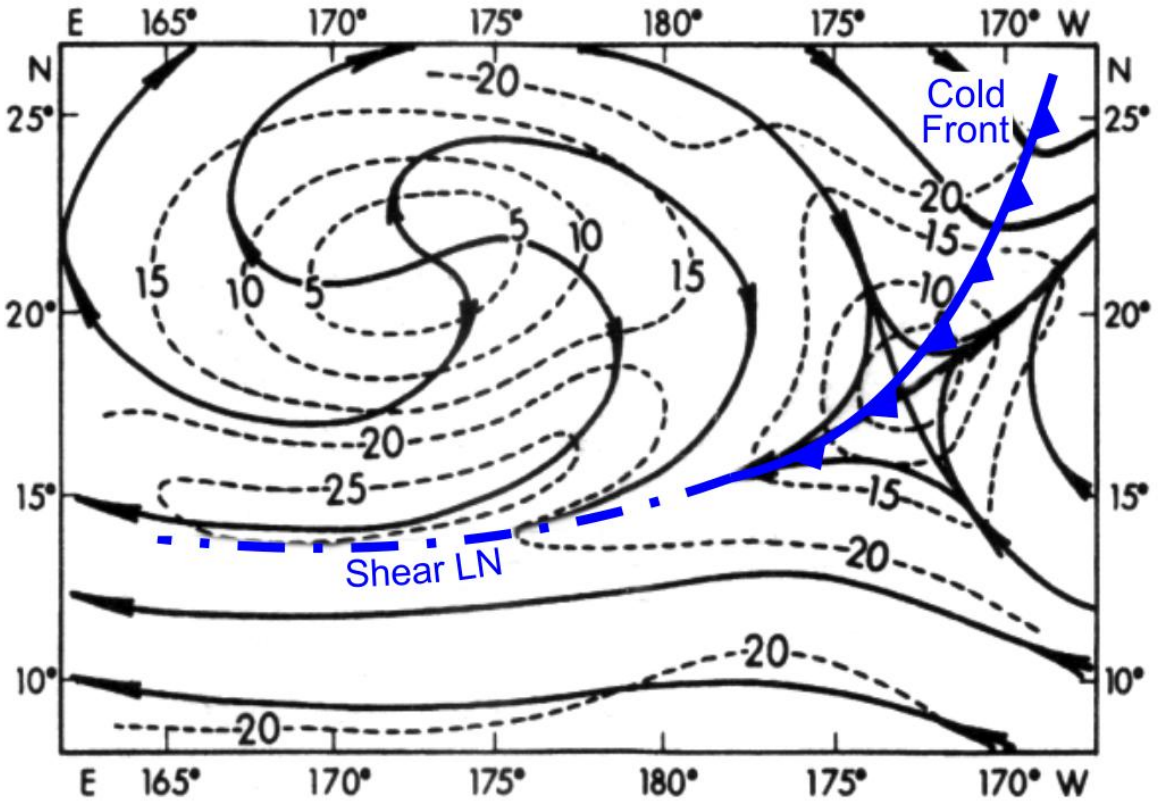


Top: Monsoon trough with NE trades converging with monsoon southwesterlies. This orientation creates cyclonic vorticity which is conducive for tropical cyclogenesis.
Bottom: ITCZ is characterized by the confluence of NE trades with SE trades. This produces a confluent area, but does not readily create cyclonic vorticity.

Depiction of the shear line on the TAFB portion of the Unified Surface Analysis

The shear line has previously been depicted by a trough symbol on the TAFB portion of the USA. In order to more accurately depict this final stage in the life cycle of a cold front over the subtropical and tropical waters, it was decided to include the shear line explicitly. The TAFB definition of a shear line follows:

Shear line – a boundary or zone that delineates where wind speed increases abruptly on the poleward side. This boundary is typically associated with the final stage in the life cycle of a cold front which has intruded into the sub tropics and tropics.



Schematic diagram illustrating a cold front extending into the tropics with streamlines (solid lines with arrows indicating wind direction) and isotachs (dashed lines indicating areas of equivalent wind speed), in knots. The shear line is depicted by the dash-dot symbol where winds associated with the weakened cold frontal boundary have become parallel on both sides of the boundary.

Implication for marine users of the TAFB surface analysis: though nearly parallel wind flow will be found on either side of the shear line, users will encounter weaker winds on its' equatorward side, and an elongated band of fresh to strong winds on the poleward side of the shear line. This band of fresh to strong winds north of the shear line often produces seas approaching 8 feet, or greater.

Implication for land areas affected by a shear line: Even though precipitation associated with the shear line is substantially lighter than that encountered in thunderstorms, mountainous terrain can enhance precipitation associated with a shear line for an extended period of time. When a shear

line remains stationary over mountainous terrain for several days, persistent rainfall can lead to significant accumulations with the potential for flash flooding and mudslides.

The ITCZ, monsoon trough, and shear line on the TAFB surface analysis will be depicted using the following symbology; respectively: