# Unit 2: Tropical Disturbances

## Learning Activities and Assignments

* Tropical Cyclone Forecasting (critical thinking activity for a group)

Guidelines for activity

Make four groups where student can chat and discuss and come to a consensus on how to match the trough/TC interaction to the right outcome and forecast. Give each group a document with the options. Each will submit a final document with the correct outcome, track and their explanation for their answer. At the end, the group can discuss the results in an online discussion.

A midlatitude trough is approaching a tropical cyclone. Consider the following four characteristics of the trough in deciding on your forecasts for the tropical cyclone track and intensity change:

1. it has small spatial scale and is centered just north of the TC latitude
2. it has large spatial scale and is centered just north of the TC latitude
3. it is extending equatorward, but is centered far poleward and moving eastwards
4. it is small and far poleward, moving due east

For each situation, identify which of the following outcomes you would expect in formulating track and intensity forecasts:

1. The trough and the tropical cyclone will interact briefly. Vertical wind shear associated with the trough is 5 m s-1 over the 850-200 hPa layer.
2. The trough and the tropical cyclone will interact for a period of a day or more. Vertical wind shear associated with the trough is 5 m s-1 over the 850-200 hPa layer
3. The trough will move to the east and there will be no interaction
4. The trough and the tropical cyclone will interact briefly. Vertical wind shear associated with the trough is 15 m s-1 over the 850-200 hPa layer
5. The trough and the tropical cyclone will interact for a period of a day or more. Vertical wind shear associated with the trough is 15 m s-1 over 850-200 hPa.

Based on the outcome you have just selected for each of the four situations, identify the most logical track and intensity change forecasts for the tropical cyclone assuming no change in ocean temperatures or any other environmental factors:

1. The TC will not be impacted by the trough and will continue to evolve as before
2. The TC will move poleward briefly and either slow in intensification or weaken for a period of time before continuing westwards
3. The TC will begin recurvature and either slow in intensification or weaken for a period of time
4. The TC will begin recurvature and weaken for a period of time and possibly undergoing extratropical transition
5. The TC will recurve, weakening and possibly undergoing extratropical transition
6. The TC will recurve, weakening and eventually decay.

**Answers expected:**

1. **it has small spatial scale and is centered just north of the TC latitude**

**B.** The trough and the tropical cyclone will interact for a period of a day or more. Vertical wind shear associated with the trough is 5 m s-1 over the 850-200 hPa layer

**iii.** The TC will begin recurvature and either slow in intensification or weaken for a period of time

1. **it has large spatial scale and is centered just north of the TC latitude**

**E.** The trough and the tropical cyclone will interact for a period of a day or more. Vertical wind shear associated with the trough is 15 m s-1 over 850-200 hPa.

**vi.** The TC will recurve, weakening and eventually decay.

1. **it is extending equatorward, but is centered far poleward and moving eastwards**

**A.** The trough and the tropical cyclone will interact briefly. Vertical wind shear associated with the trough is 5 m s-1 over the 850-200 hPa layer.

**ii.** The TC will move poleward briefly and either slow in intensification or weaken for a period of time before continuing westwards

1. **it is small and far poleward, moving due east**

**C.** The trough will move to the east and there will be no interaction

**i.** The TC will not be impacted by the trough and will continue to evolve as before