# Unit 3: General Mesoscale Phenomena

## Learning Objectives

At the end of this unit, learners should be able to:

* Describe the formation, structure, and lifecycle of ordinary and multi-cellular thunderstorms
* Recall the structure and lifecycle of tropical mesoscale convective systems (MCS) including tropical squall line, bow echo, mesoscale convective complex, mesoscale convective vortex, and non-squall tropical cluster
* Identify MCSs in satellite and radar imagery
* List the potential weather hazards most likely associated with each type of MCS
* Identify key dynamic and thermodynamic environments favorable for each type of MCS, including favorable large-scale environments.
* Understand similarities and differences between tropical and midlatitude squall lines
* Describe the geographic climatology of tropical MCSs
* Describe why and how sea-land breezes form
* Describe why and how mountain-valley breezes form
* Describe the structure and formation of tornadoes, waterspouts, and dust devils