

Cumulus Cloud Lines in the Florida Keys

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Overview: Cumulus cloud lines are a common occurrence over the Florida Keys and are a good example of a microclimate for our area. Cloud lines can occur anytime throughout the year but are most common during summer months. They can form anywhere over the Florida Keys and often extend over the near shore waters. These lines can take on various orientations and can extend over small portions of the Keys or the entire length of the Keys island chain. These cloud lines are capable of producing significant weather impacts (heavy convective precipitation, lightning, waterspouts) that affect the Keys island and marine communities.

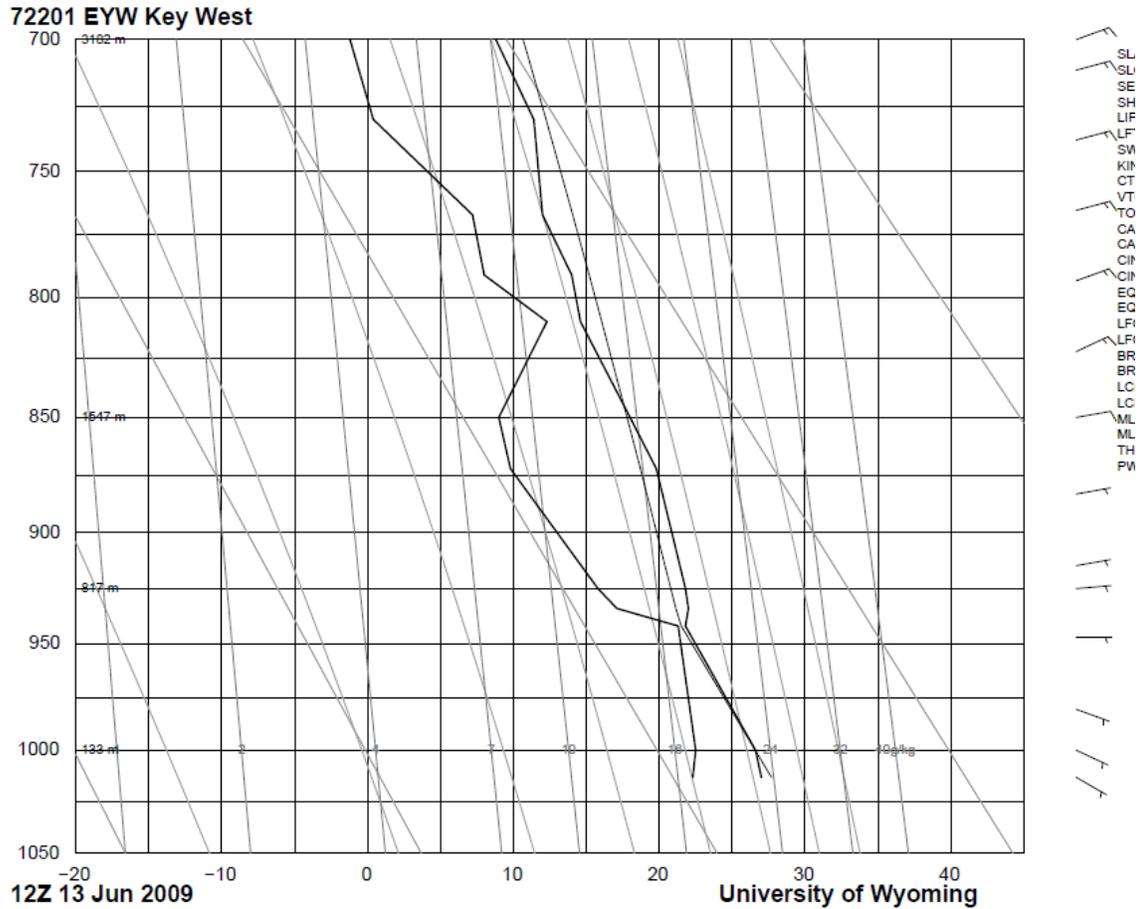
Formation: The development of cumulus cloud lines over the Florida Keys is a result of solar heating of the Keys island chain which results in the triggering of convection in a typically moist and conditionally unstable lower atmosphere. The wind flow in the lower atmosphere along with the orientation of the heated island landmass dictates the orientation of these cloud lines. Cloud lines that form parallel to the Keys island chain typically are a result of a light winds that allow the heated low-level air to remain over the island chain heat source. The cumulus clouds can redevelop over the same area until the heat source is no longer able to support the production of convective updrafts.

Impacts: These cumulus cloud lines can also have significant impacts to both island chain communities and marine customers. A significant marine hazard that occurs from the formation of cumulus cloud lines is the development of waterspouts over the near shore waters. These waterspouts result in the issuance of numerous Special Marine Warnings by the National Weather Service office in Key West. Overland, showers and thunderstorms within the cloud line can impact airport operations with the threat of lightning and may also produce small scale urban flooding throughout the Keys.



Environment: A wind direction that generally parallels the Keys island chain and light winds (<15kts) with little vertical shear of the horizontal winds in the lowest few kilometers is desirable for development. Below is a Skew-T example from a day when a cloud line formed in a light easterly flow regime with a conditional unstable lower atmosphere. When the cumulus clouds began to form, they formed vertically and extended to the west (Not pictured). New cumulus clouds formed over the same area and

moved to the west causing a line of clouds to develop. This cloud line eventually produced thunderstorms and heavy rain over Key West as well as waterspouts over the near shore waters. As a result, the National Weather Service produced Special Marine Warnings for the waterspouts and Airport Weather Warnings for lightning near the airport.



Conclusion: Cloud lines are a significant microclimatological occurrence in the Florida Keys during the summer months. Formation of cloud lines can significantly change the weather conditions throughout the day and can affect lives across the Florida Keys and near shore waters.