

Weather Analysis and Forecasting: Homework 1, Part 2 KEY

35 points: 15 CAPE calculation, 10 Indices, 10 Discussion/Forecast Inference

Station #1 Estimates and Forecast Inference

Convective (maximum) temperature: 37°C

Convective condensation level (CCL), boundary layer depth: 800-mb

Level of free convection (LFC): 700-mb

Convective inhibition (CIN): -66 J kg⁻¹

Convective available potential energy (CAPE): 3354 J kg⁻¹ → ***Strong convection***

Maximum vertical velocity estimate of storm updraft: 82 m s⁻¹

Equilibrium level: About 150-mb

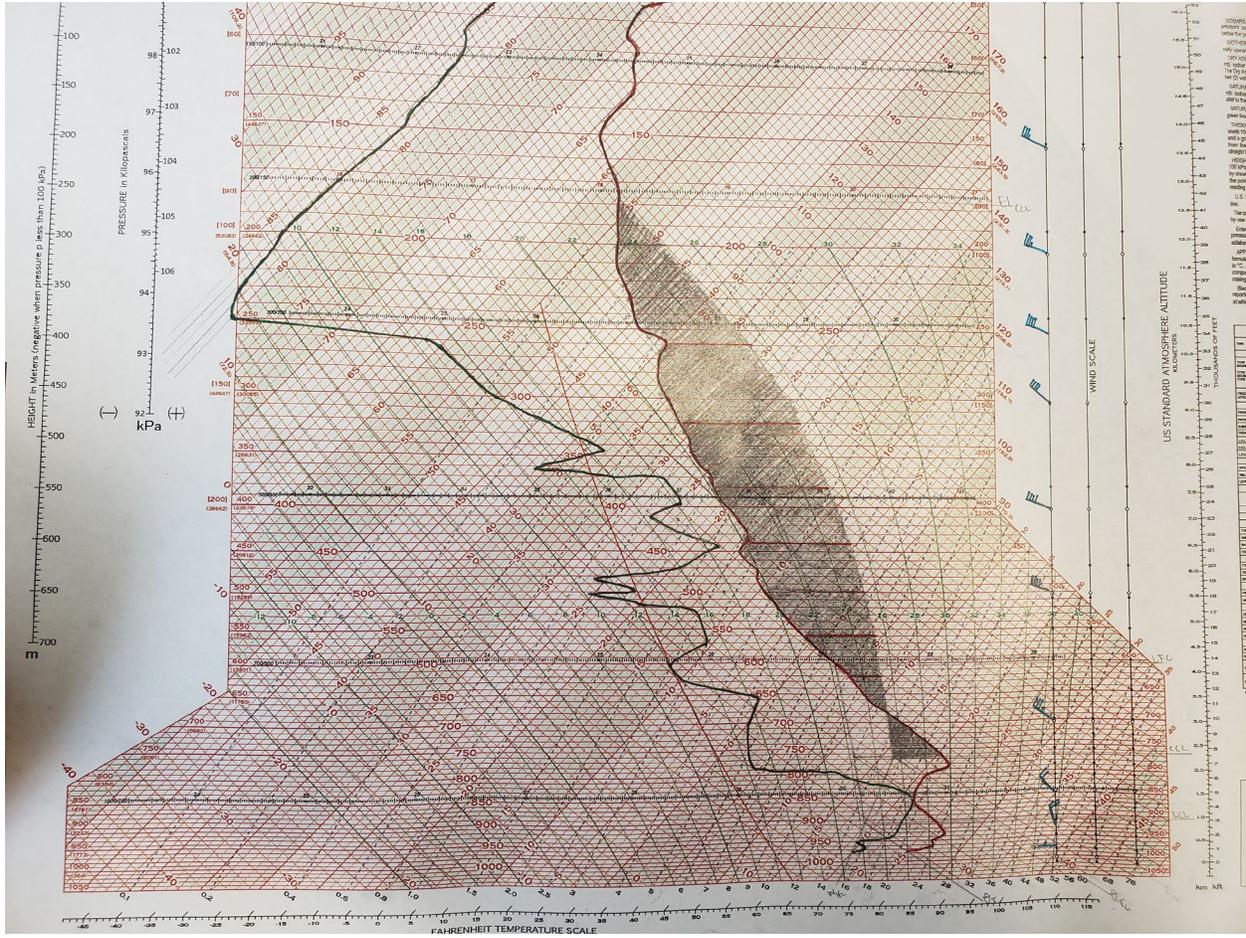
Showalter Index: -11.4 → ***Good strong thunderstorm potential***

Lifted index: -9.6 → ***Heavy to strong thunderstorm potential***

K index: 38 → ***Numerous thunderstorms***

Totals-Totals: 61 → ***Numerous thunderstorms, scattered severe, tornadic***

Station #1: Sample student sounding



Station #2 Estimates and Forecast Inference

Convective (maximum) temperature: 37°C

Convective condensation level (CCL), boundary layer depth: 700-mb

Level of free convection (LFC): 660-mb

Convective inhibition (CIN): -30 J kg^{-1}

Convective available potential energy (CAPE): $650 \text{ J kg}^{-1} \rightarrow$ ***Moderate convection***

Maximum vertical velocity estimate of storm updraft: 36 m s^{-1}

Equilibrium level: A little above 230-mb

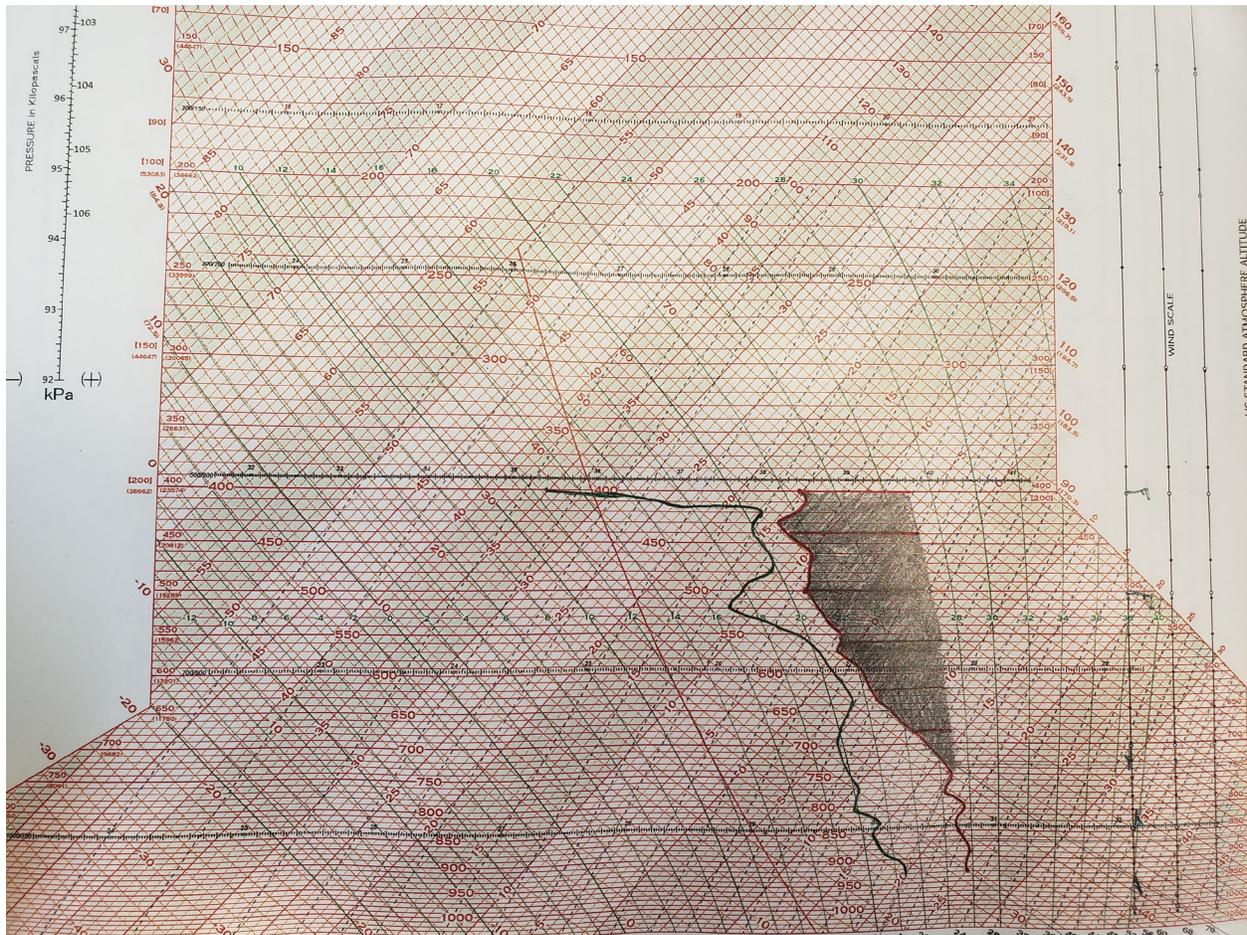
Showalter Index: $-3.1 \rightarrow$ ***Thunderstorms probable***

Lifted index: $-4.1 \rightarrow$ ***Thunderstorms possible***

K index: 36 \rightarrow ***Numerous thunderstorms***

Totals-Totals: 51 \rightarrow ***Isolated to scattered thunderstorms***

Station #2: Sample student sounding



Station #3 Estimates and Forecast Inference

Convective (maximum) temperature: 28°C

Convective condensation level (CCL), boundary layer depth: 800-mb

Level of free convection (LFC): 700-mb

Convective inhibition (CIN): -180 J kg^{-1} → Strong cap, favors more isolated convection

Convective available potential energy (CAPE): 1690 J kg^{-1} → **Strong convection**

Maximum vertical velocity estimate of storm updraft: 58 m s^{-1}

Equilibrium level: A little above 200-mb

Showalter Index: -2.5 → **Thunderstorms probable**

Lifted index: -9.1 → **Heavy to strong thunderstorm potential**

K index: 24 → **Widely scattered thunderstorms**

Totals-Totals: 55 → **Scattered to numerous thunderstorm, few severe, tornadic**

Station #3: Sample student sounding

