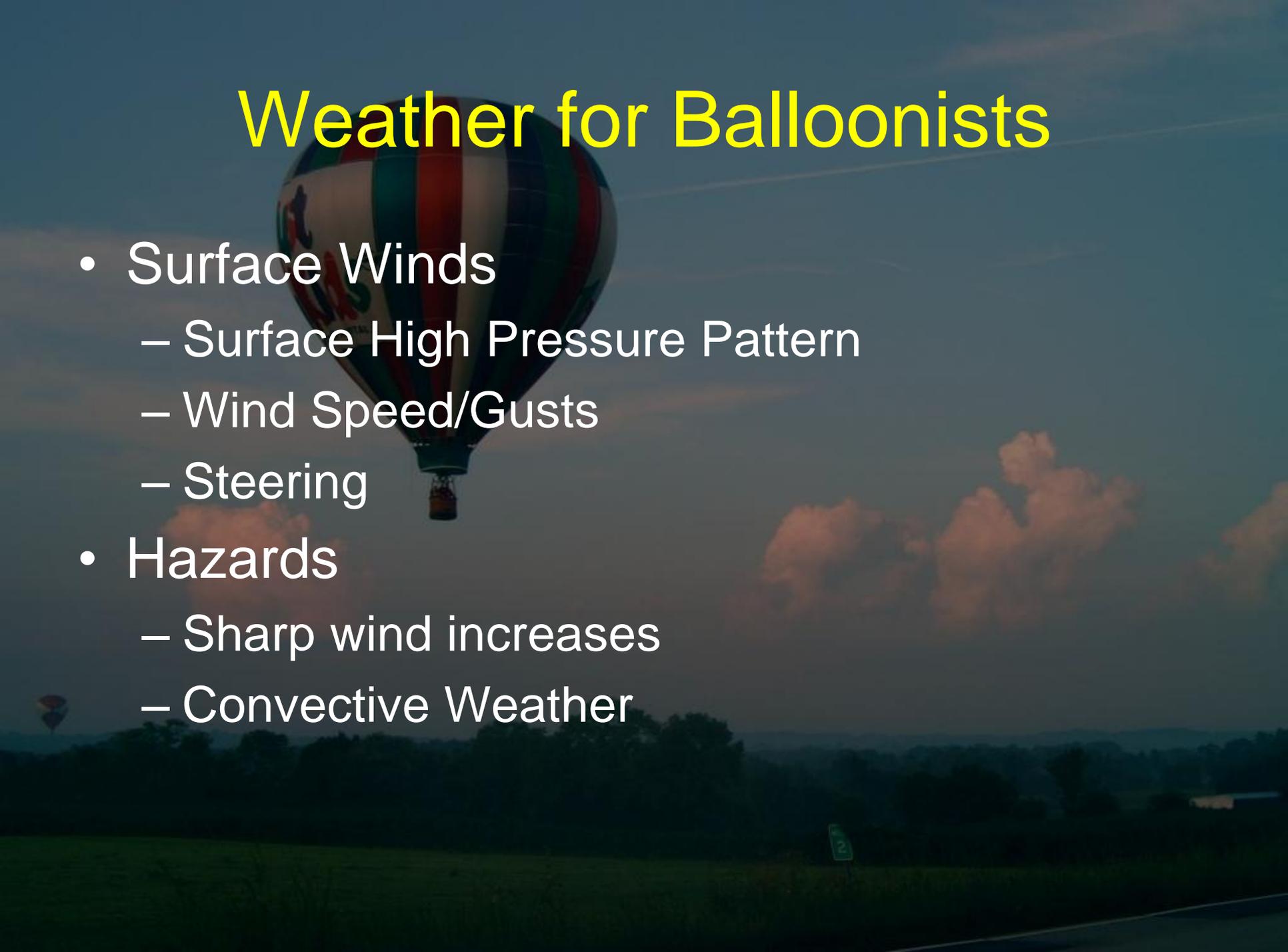




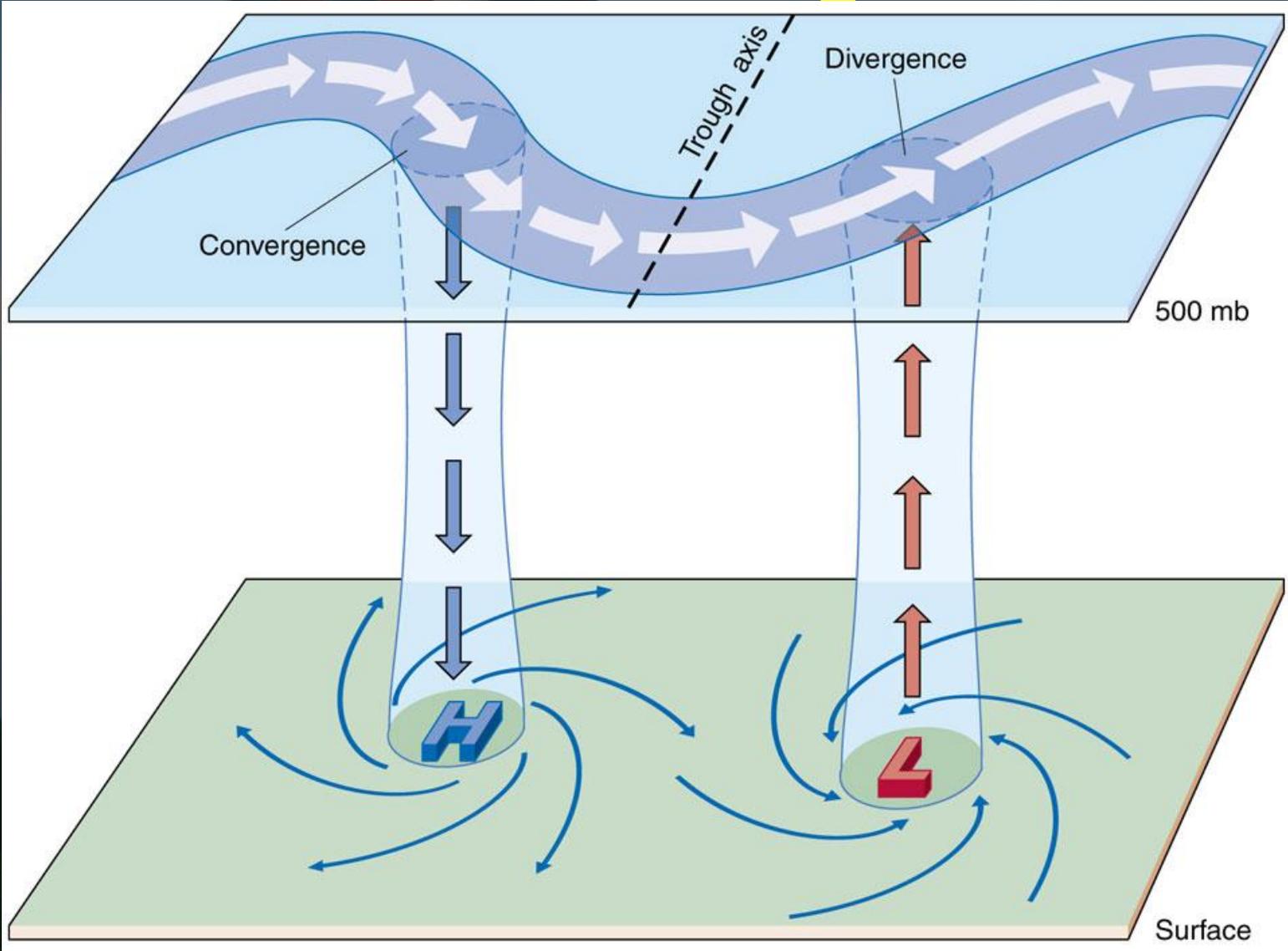
Weather for Balloonists

Weather for Balloonists

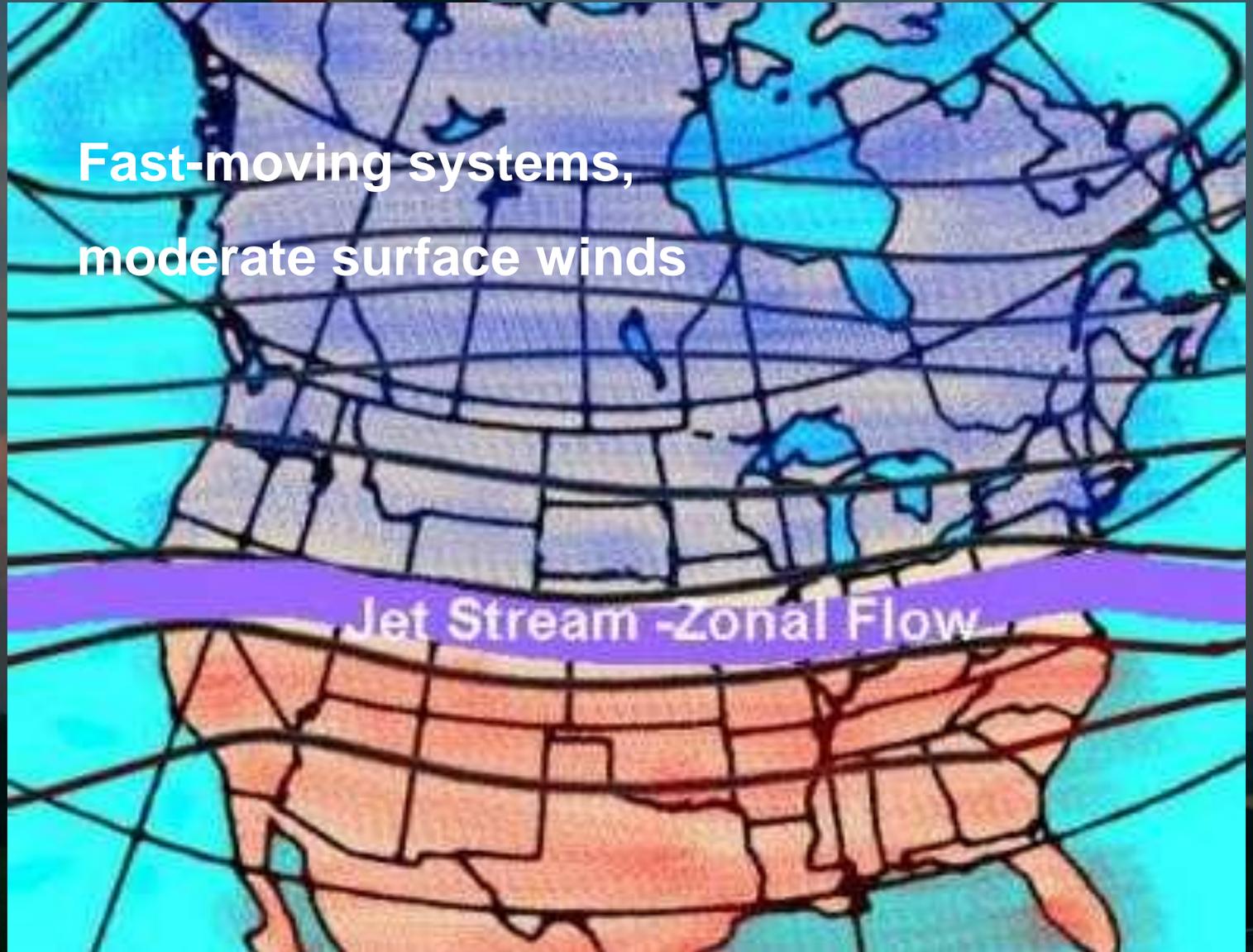
A hot air balloon with red, white, and green vertical stripes is floating in a twilight sky. The background shows a dark landscape with trees and a field under a sky with soft, orange-tinted clouds. The title 'Weather for Balloonists' is written in yellow at the top.

- Surface Winds
 - Surface High Pressure Pattern
 - Wind Speed/Gusts
 - Steering
- Hazards
 - Sharp wind increases
 - Convective Weather

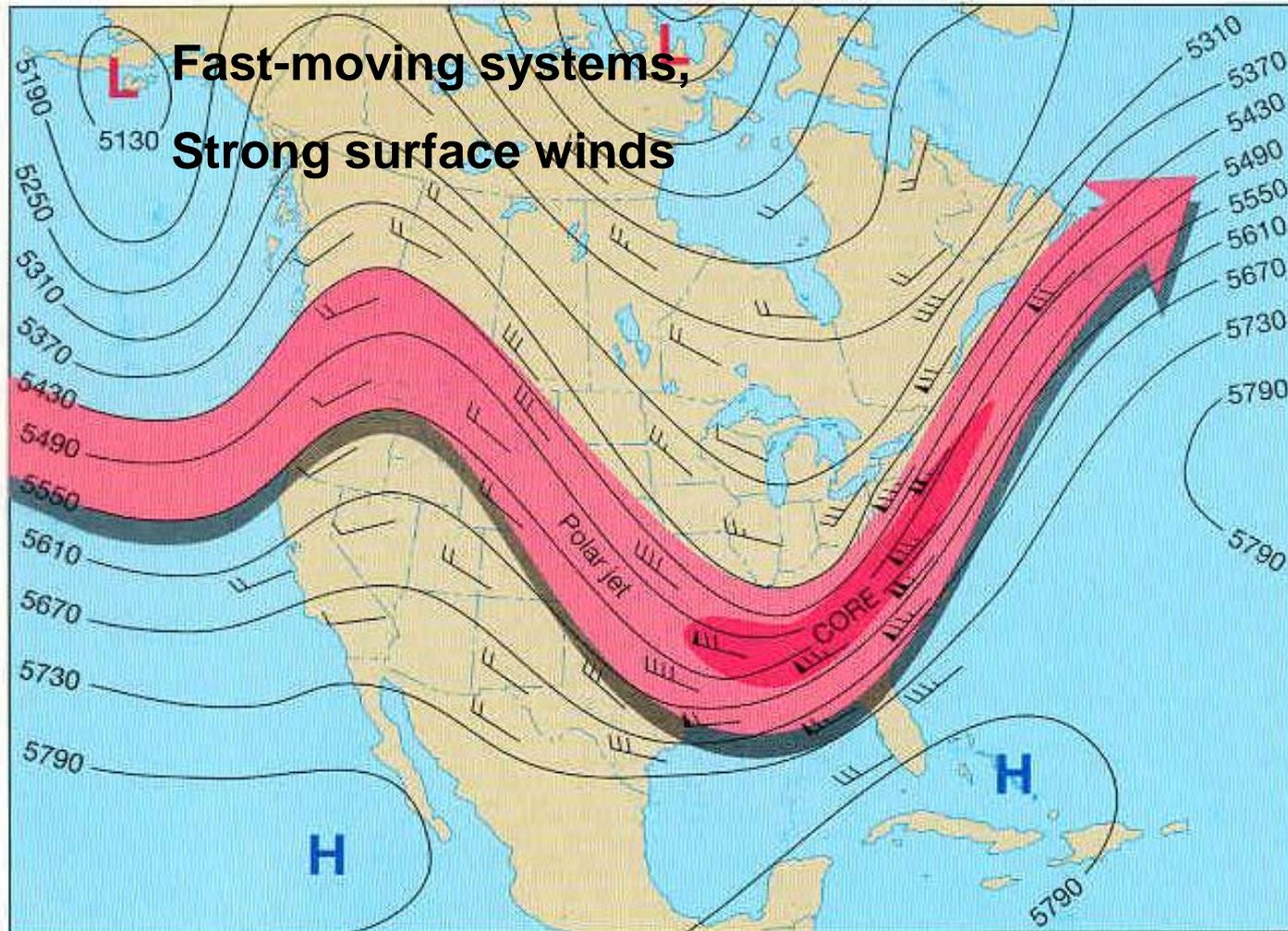
Surface Highs



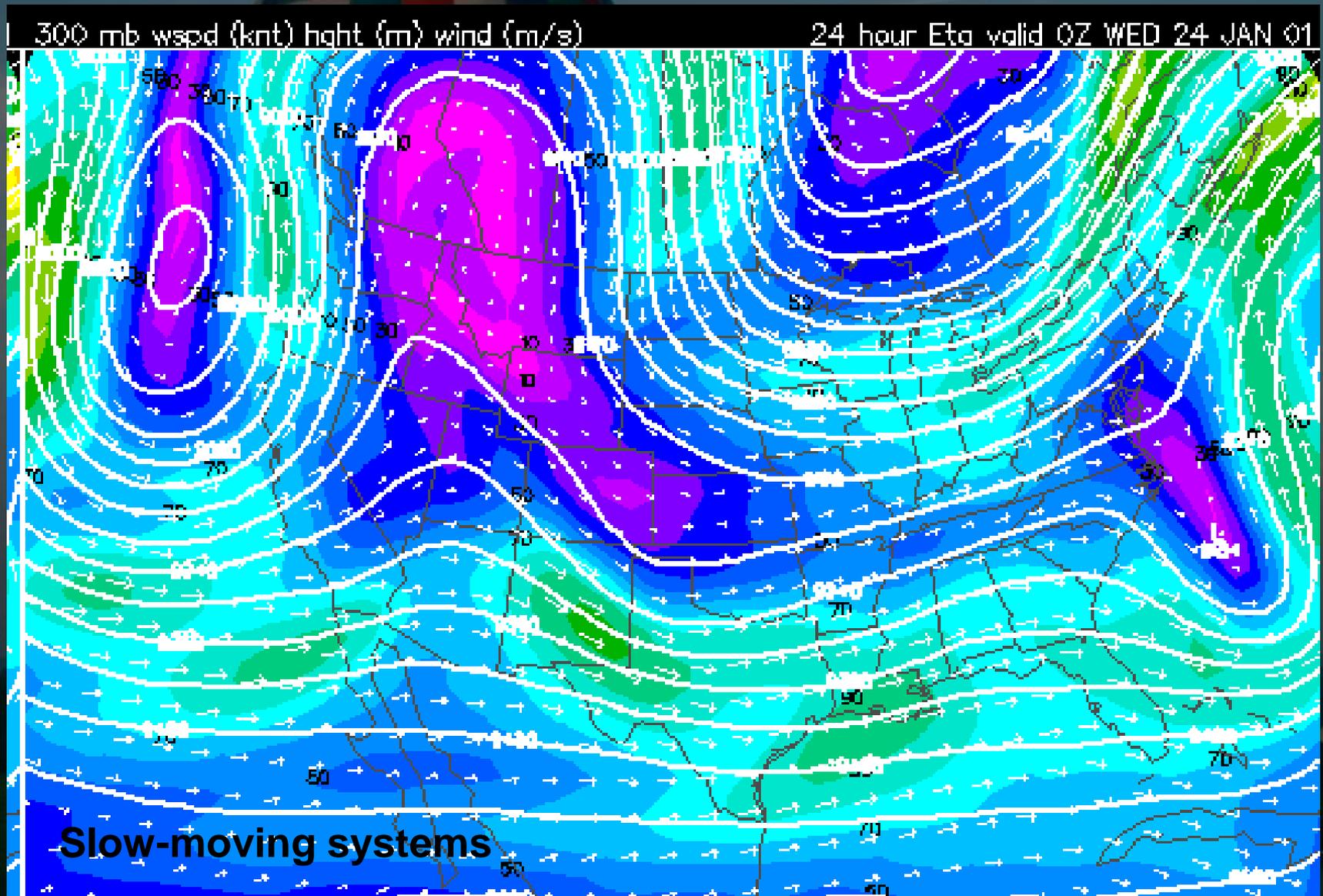
Jet Stream Patterns



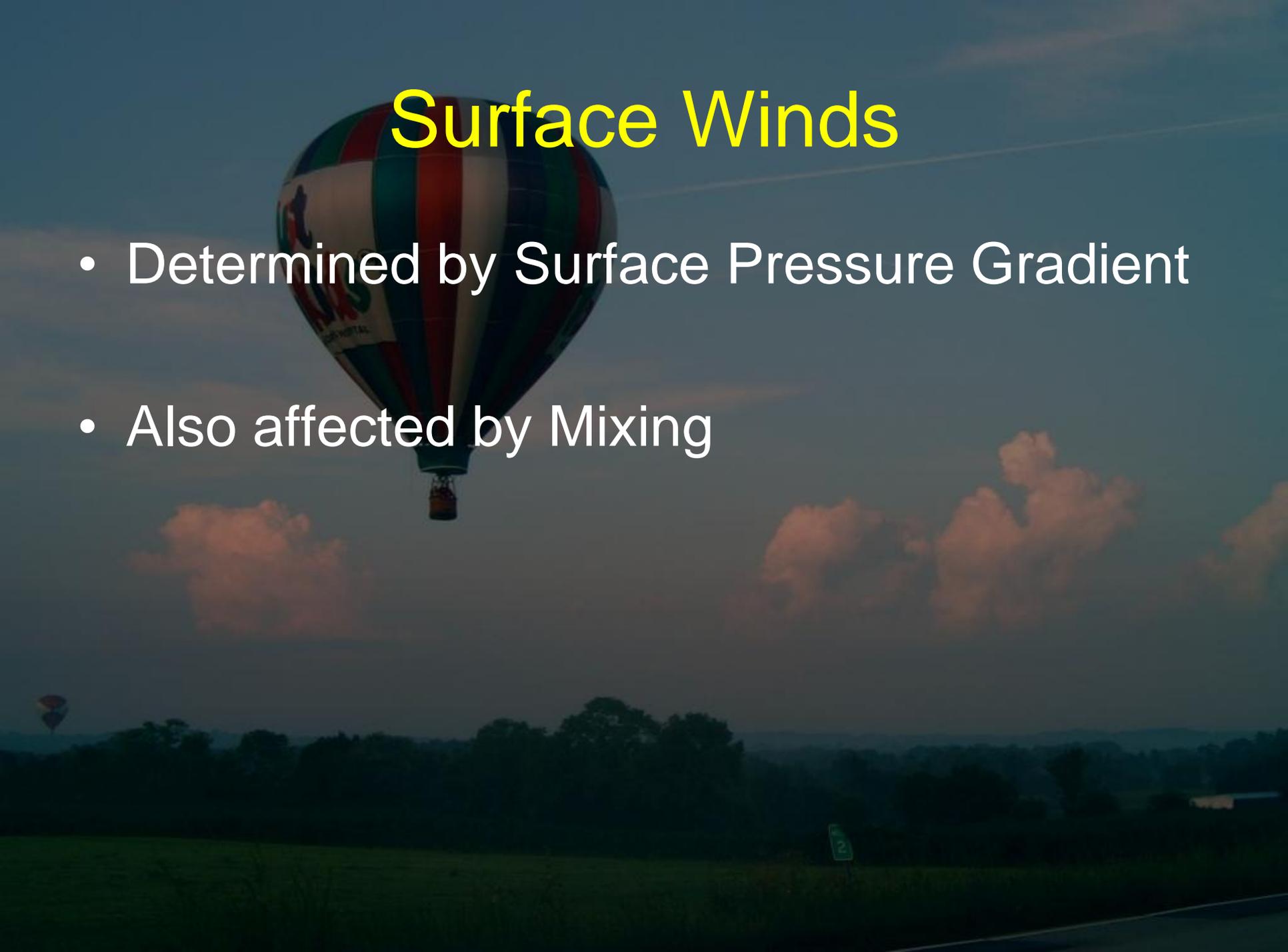
Jet Stream Patterns



Jet Stream Patterns – Split Flow

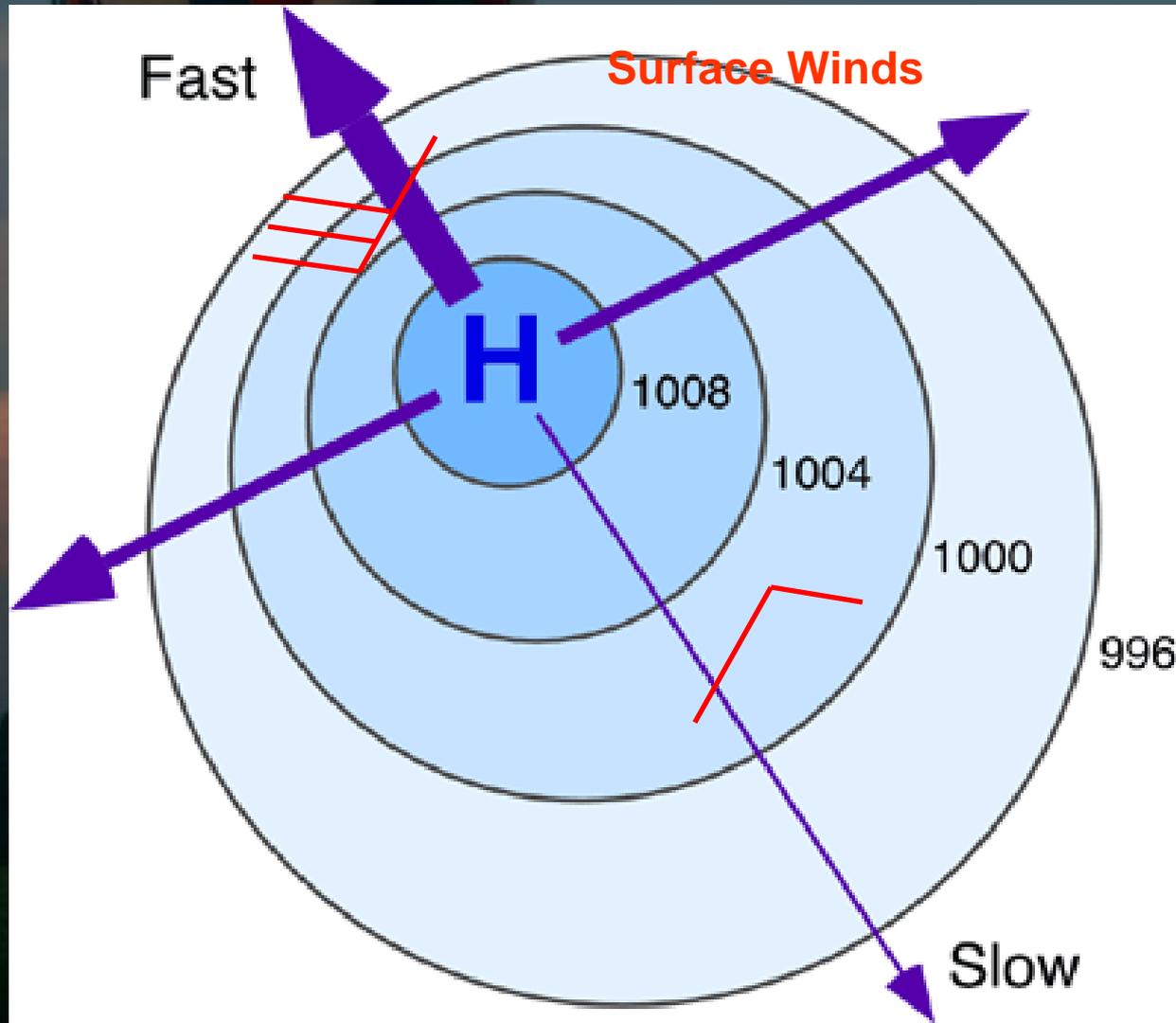


Surface Winds

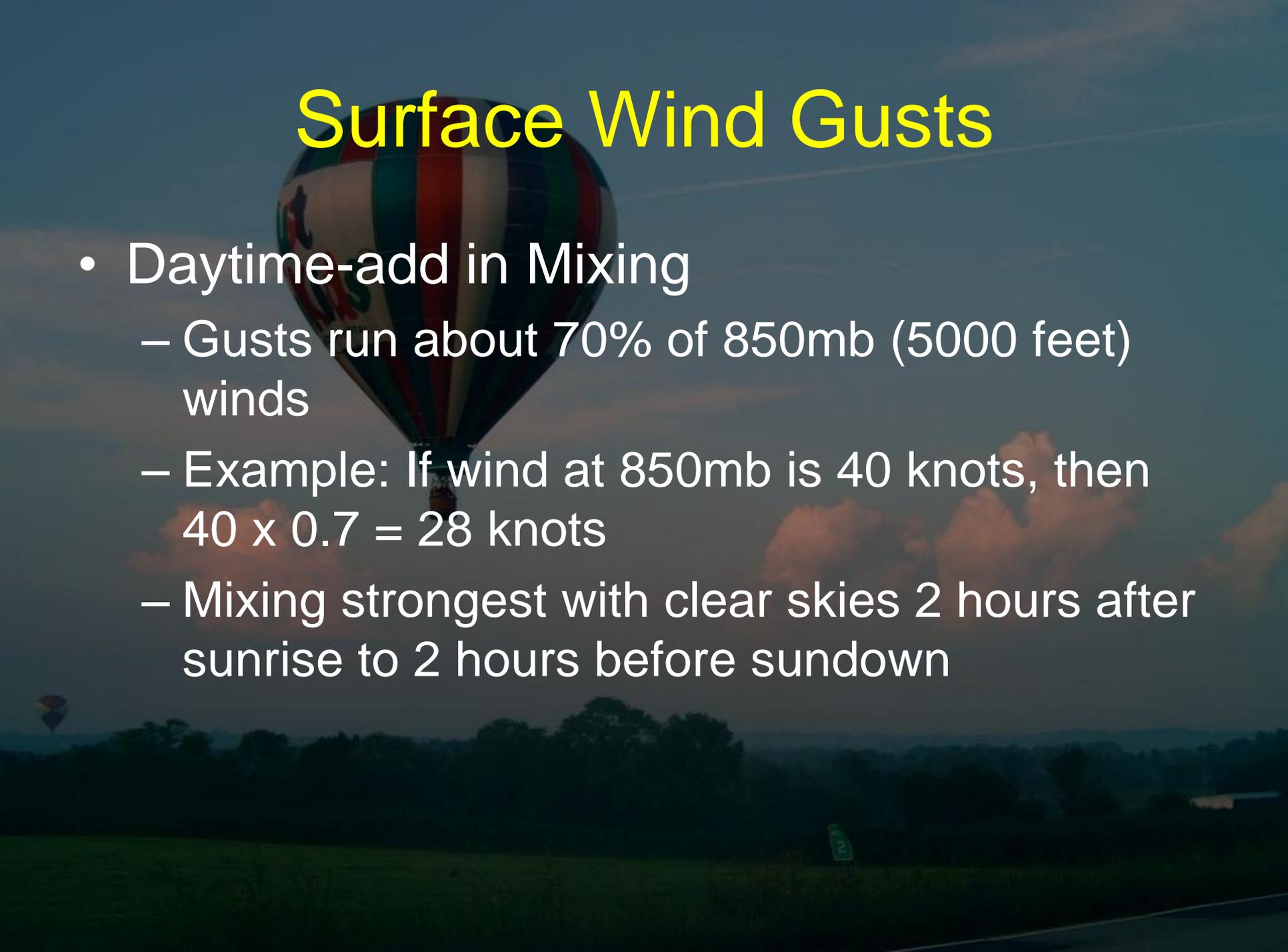


- Determined by Surface Pressure Gradient
- Also affected by Mixing

Surface Pressure Gradient

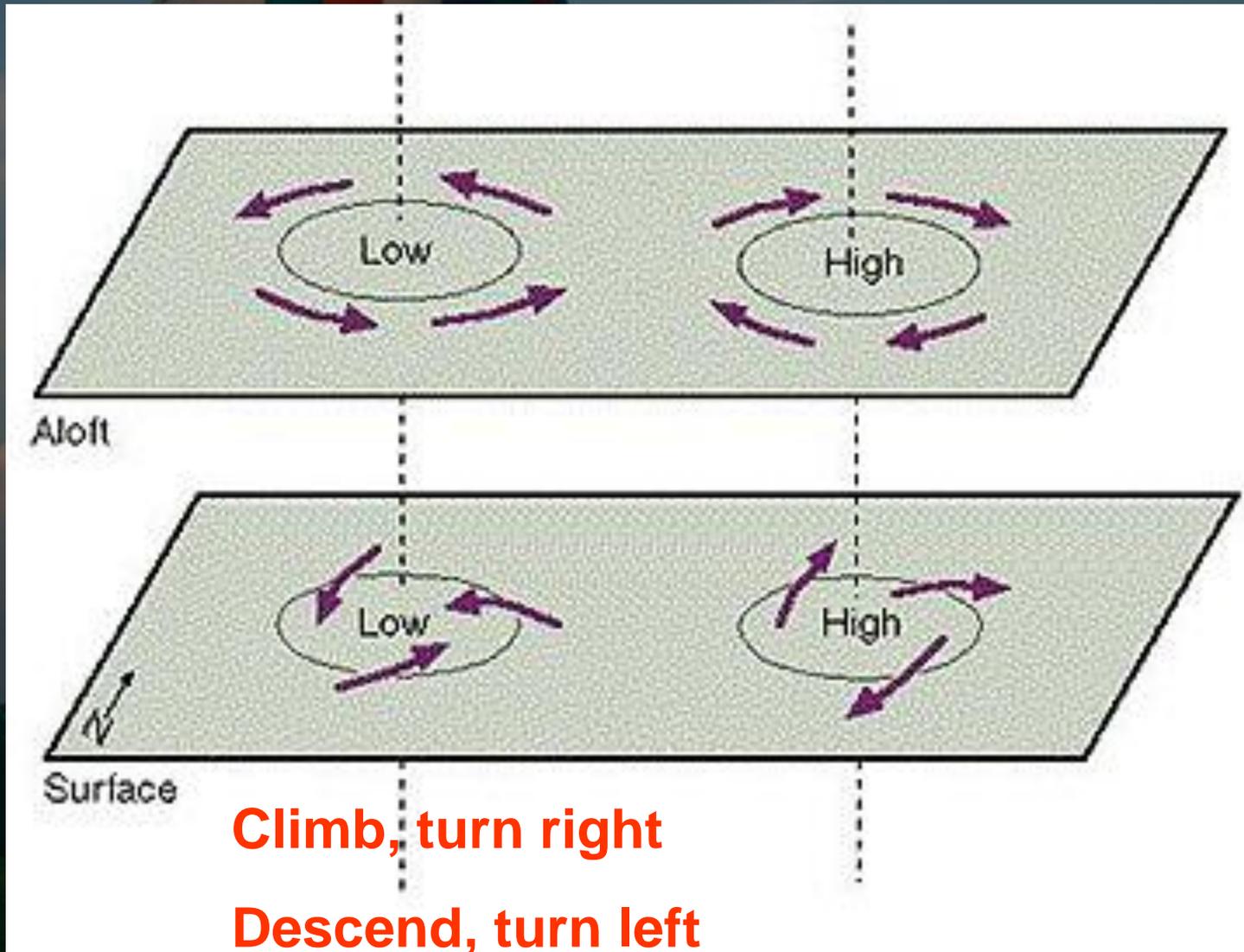


Surface Wind Gusts



- Daytime-add in Mixing
 - Gusts run about 70% of 850mb (5000 feet) winds
 - Example: If wind at 850mb is 40 knots, then $40 \times 0.7 = 28$ knots
 - Mixing strongest with clear skies 2 hours after sunrise to 2 hours before sundown

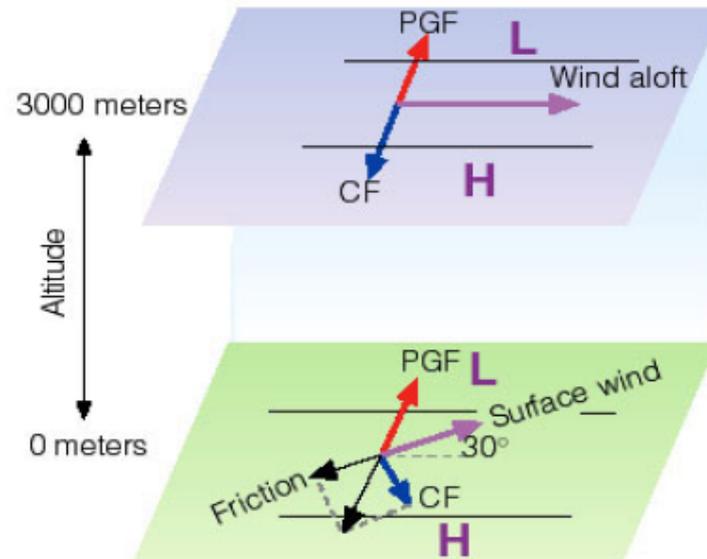
Steering due to Friction



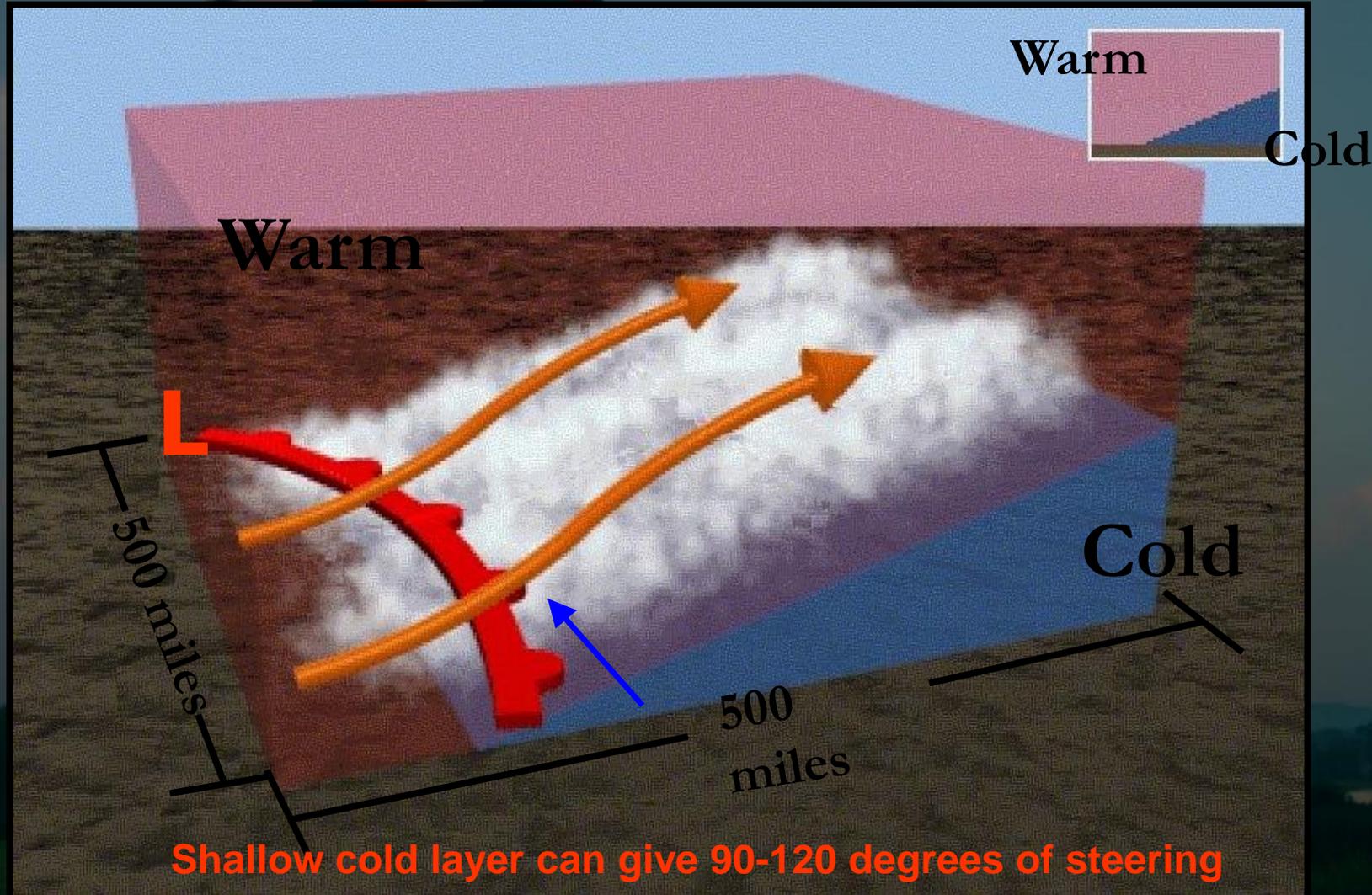
Steering due to Friction

~ 30 degrees over land

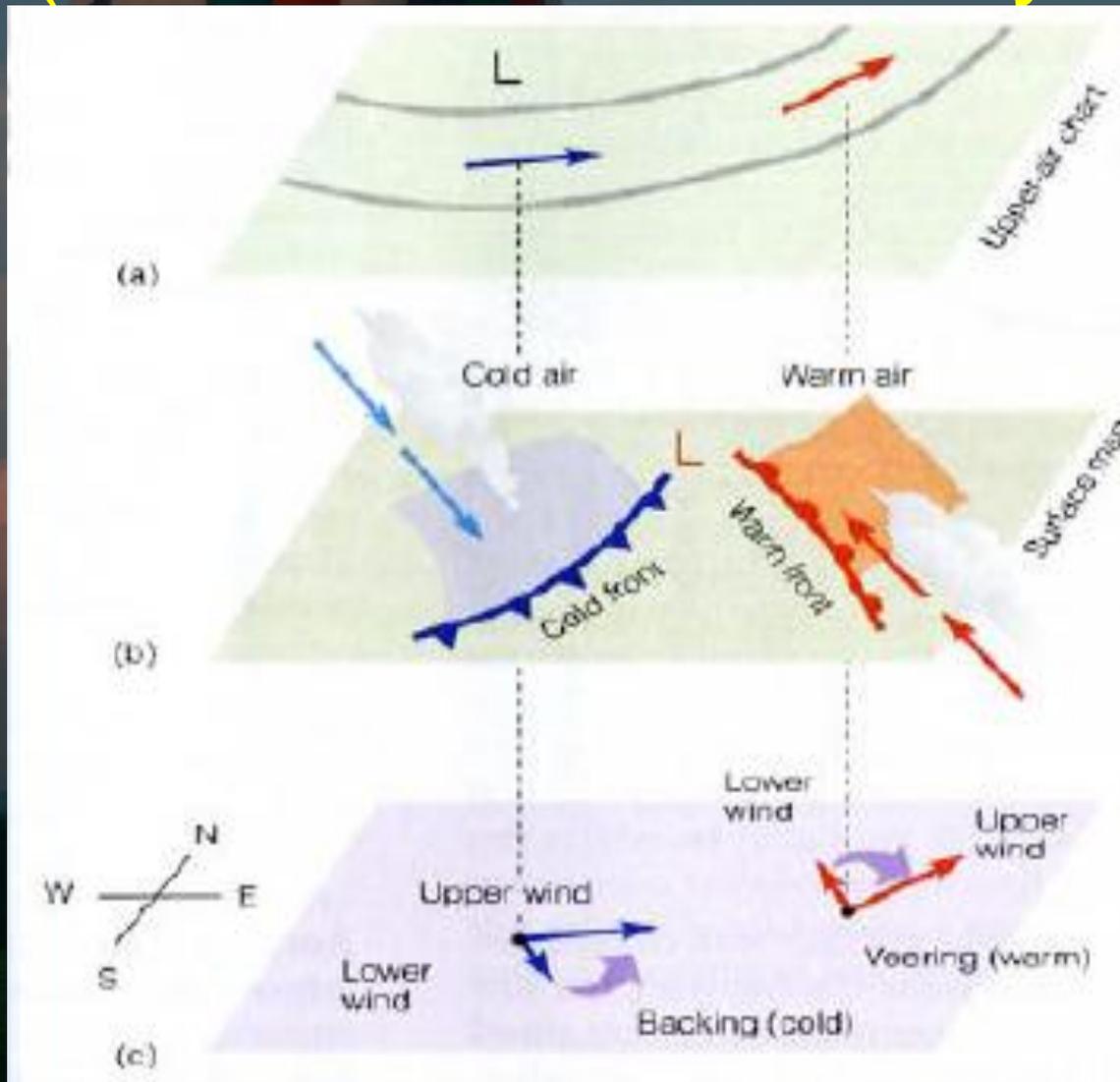
If the wind speed is reduced by friction, the Coriolis force will decrease and not quite balance the pressure gradient force
→ Force imbalance (PGF > CF) pushes wind in toward low pressure



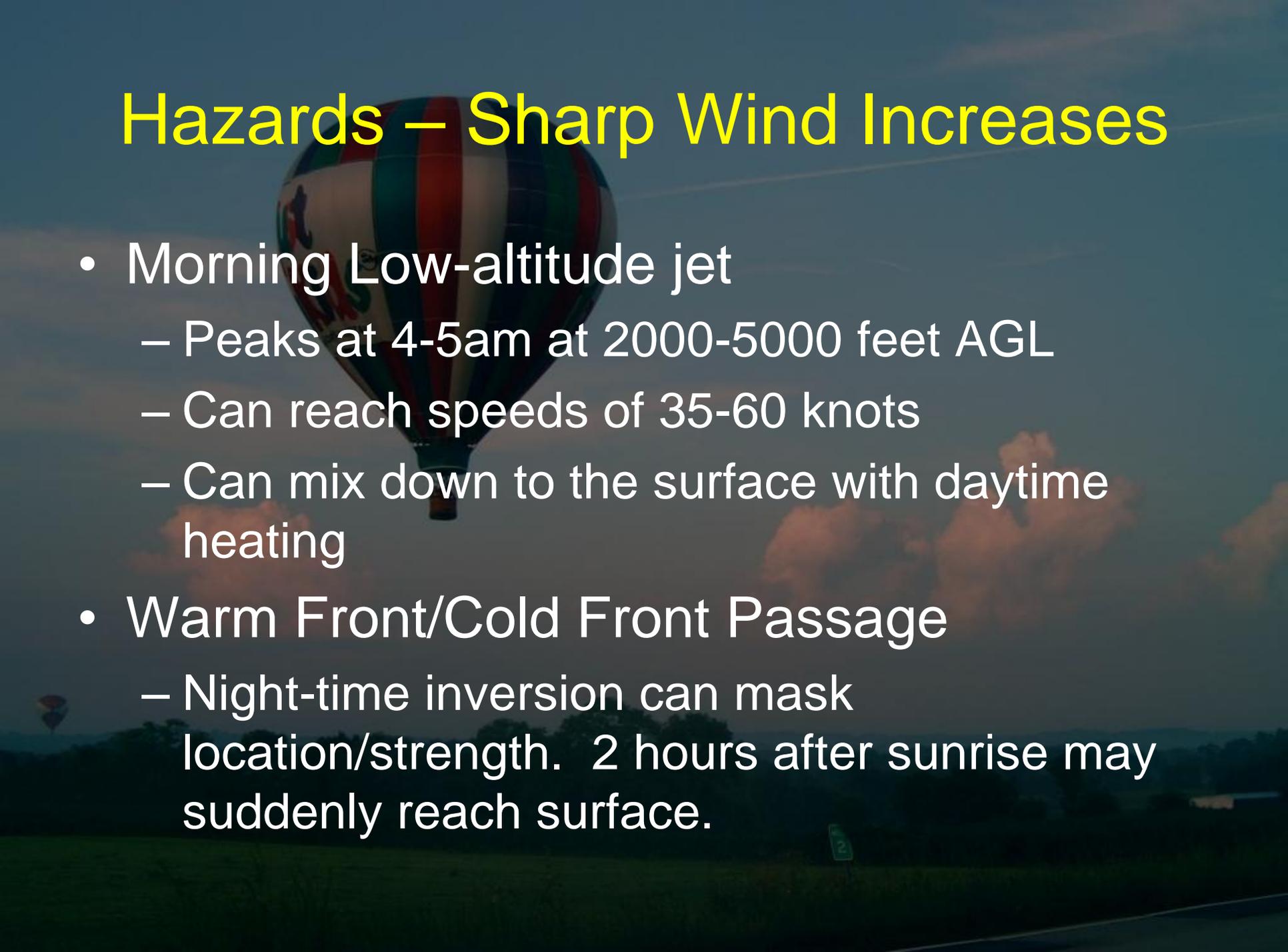
Increased Steering due to Warm Advection



Cold Advection – Reverse Steering (well above friction layer)

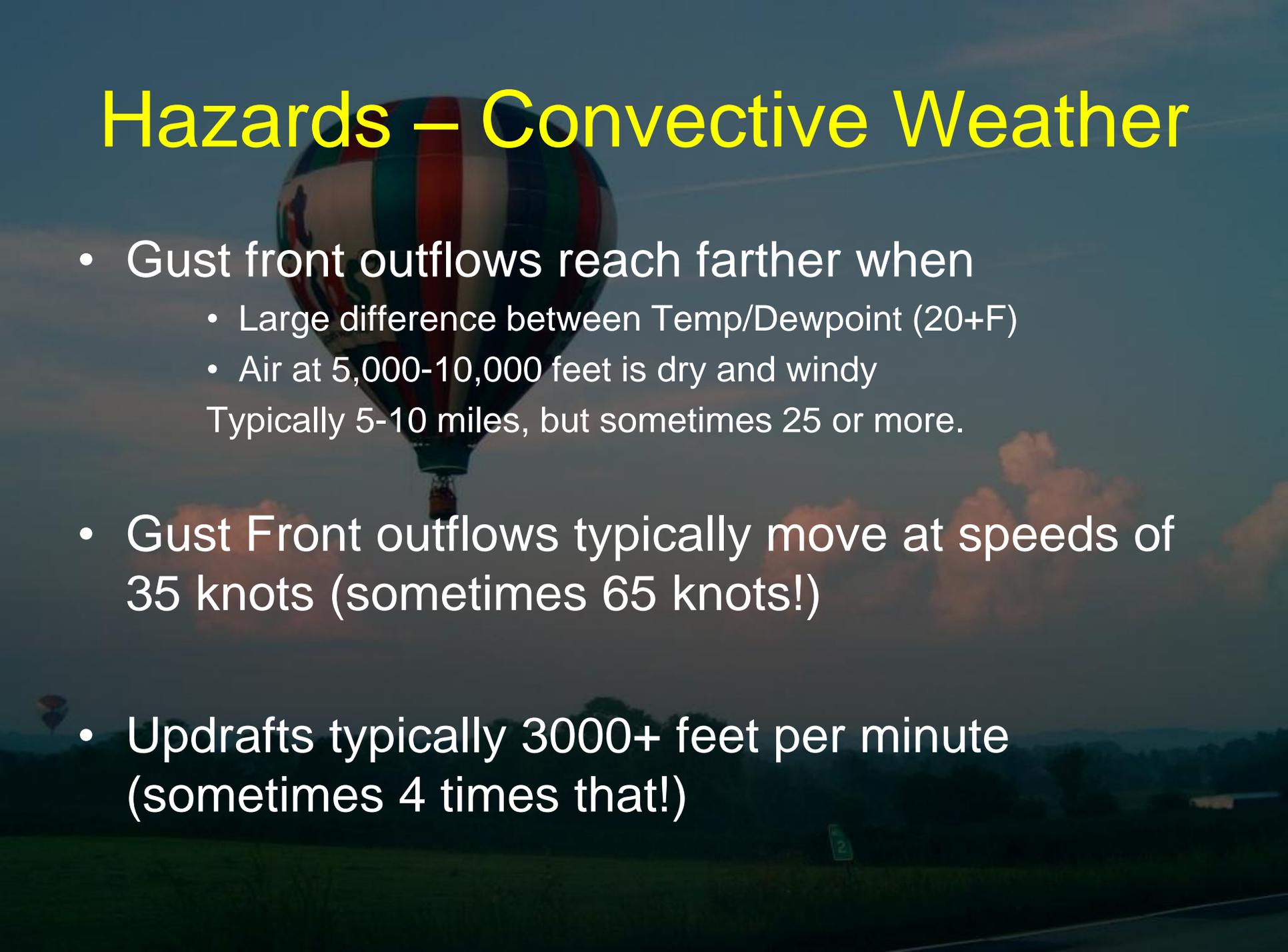


Hazards – Sharp Wind Increases



- Morning Low-altitude jet
 - Peaks at 4-5am at 2000-5000 feet AGL
 - Can reach speeds of 35-60 knots
 - Can mix down to the surface with daytime heating
- Warm Front/Cold Front Passage
 - Night-time inversion can mask location/strength. 2 hours after sunrise may suddenly reach surface.

Hazards – Convective Weather



- Gust front outflows reach farther when
 - Large difference between Temp/Dewpoint (20+F)
 - Air at 5,000-10,000 feet is dry and windyTypically 5-10 miles, but sometimes 25 or more.
- Gust Front outflows typically move at speeds of 35 knots (sometimes 65 knots!)
- Updrafts typically 3000+ feet per minute (sometimes 4 times that!)

BUFKIT

