

LAND-SURFACE OBSERVATIONS

Importance to Forecasts of PBL Profiles

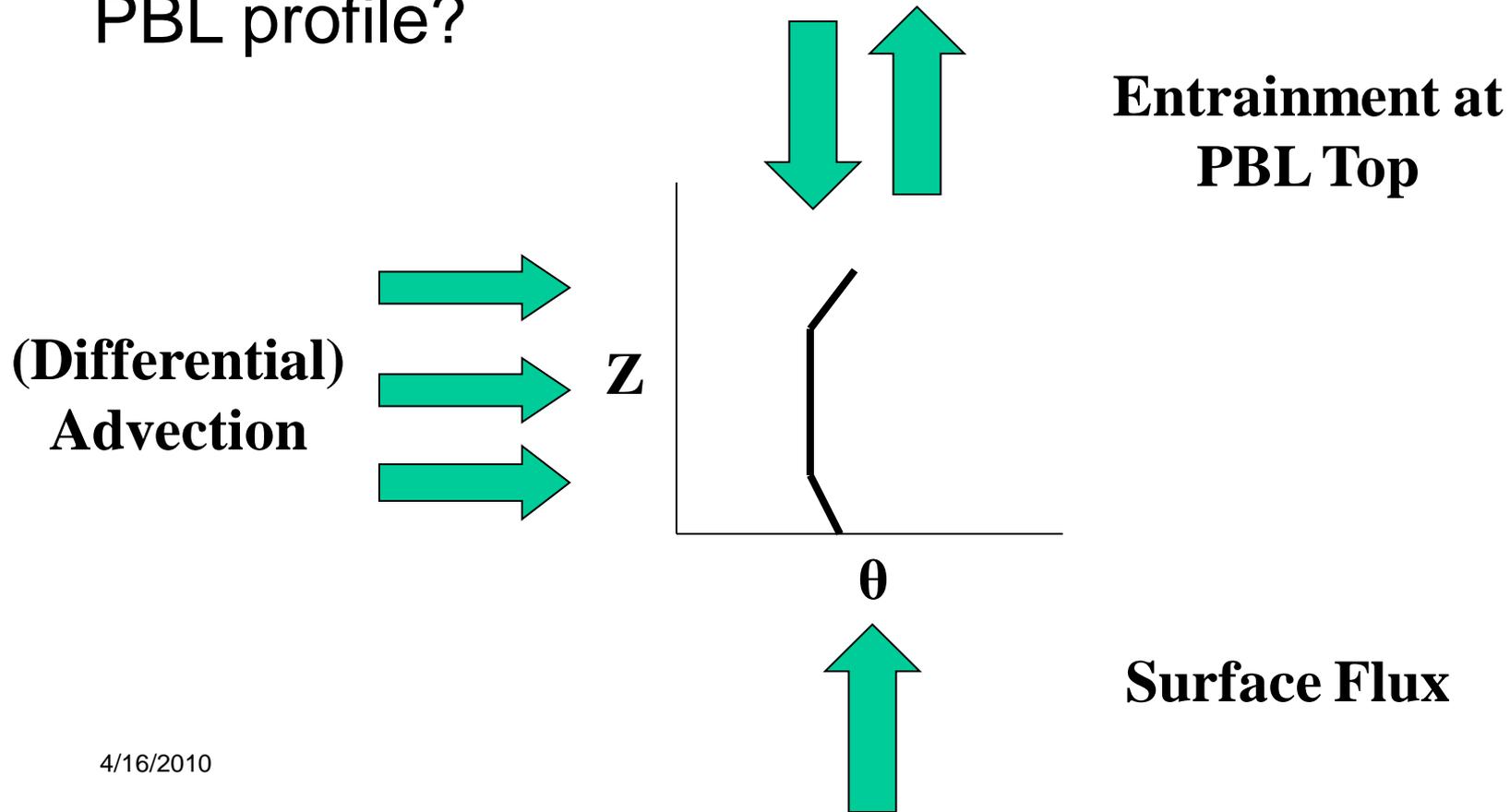
***Joint Interagency Aviation Weather Research and Coordination Meeting
Boulder, CO***

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March 23, 1010

PBL Budget

- Why does the land surface matter?
- The answer lies in the question: What drives a PBL profile?





Surface Fluxes and PBL Profiles

- In the most challenging forecasting situations, dynamical forcing is weak
 - the surface fluxes become the dominant driver of the PBL profile on diurnal time scale

- The surface fluxes and the diurnal cycle over land: driven by the surface energy balance

$$\mathbf{R_n = H + LE + G}$$

- The net radiation at the surface is partitioned among:
 - Conduction into the land-surface (G)
 - Sensible heat flux (H): PBL temp profile
 - Evapotranspiration (LE): PBL moisture profile
- It's what the land-surface *does with* available radiation that drives the exchange of heat and moisture with the surface



Needed Observations

- Solar Radiation at the surface
 - The radiative driver
- Precipitation
 - The hydrological driver
- Soil Moisture
 - First-order driver of partitioning between H and LE
 - First-order driver of partitioning infiltration from runoff
 - Cannot separate surface hydrologic budget from surface energy budget!
- Soil Temperature:
 - Determining the ground heat flux and the “Skin Temperature”
 - Lower boundary condition for a PBL temperature profile
- Vegetation fraction/amount and greenness
 - First order parameter in determining amount of transpiration
 - “Fixed” Land-Surface characteristics