Convective Storms
Initiation

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Why is the Black Hill ... black?
it has a maximum of mean hail days

And most CG lightning strokes in Romania
Conditions for Deep Moist Convection

CIN

Instability

Moisture

Updraft

Moisture

CIN
Instability

Upper level: cold, dry

Low level: warm, moist
Without mountains, Westerly flow would be uniform.
The Carpathian Mountains modify the flow, creating a convergence zone.
A back-building squall line forms on the convergence and outflow boundaries.
Example: Back-building squall line
Look for convergence lines

Find Boundaries Intersection
Convergence types - Romania

Convergence Zone

See breeze

N Convergence

Back building squall line

Mountain breeze

S Convergence
Sea Breeze

Vertical wind profile at x

Source of clockwise rotation

Carpathian Mountains

Low level warm

Sea breeze

Black Sea
Sea Breeze example 1
Southern Convergence Flows

Carpathian Mountains

Source of clockwise rotation

Vertical wind profile at x

Dry

Low-level

ST Jet

Moist

Black Sea
HRC- strong wind shear instability, and a bit of convective instability in PBL.
What can we say about wind direction in PBL in points A and B?
What cloud features can we identify?
Northern pericarpathic flow
Roll clouds
Boundaries Interactions
What are cloud streets?
Vorticity structure along the sea-breeze front
Stability Influences on Thunderstorm Evolution

Soundings are of limited use for thunderstorm nowcasting because of small-scale variability in water vapor.

Horizonal Convective Rolls modify the water vapor field.

The highest moisture is typically in the updraft portion of horizontal convective rolls. Thus if the sounding does not go up in the updraft the potential for thunderstorms is likely underestimated.

Weckwerth et al, 1996