

Hydrologic Process Governing the Changes in Water Vapor Isotopologue during ENSO

What's happening with the water isotopologue during ENSO?

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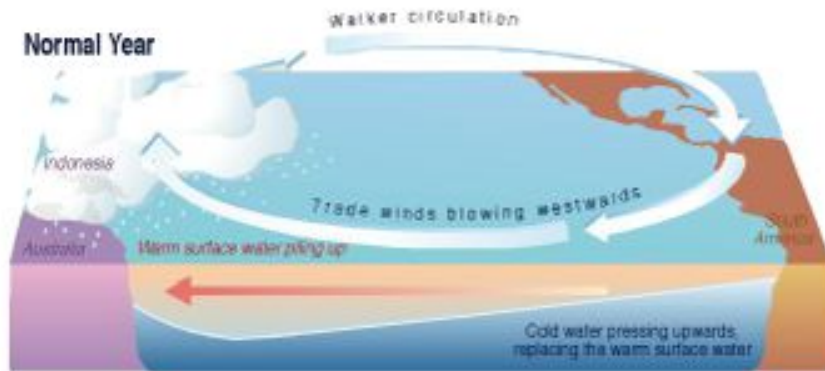


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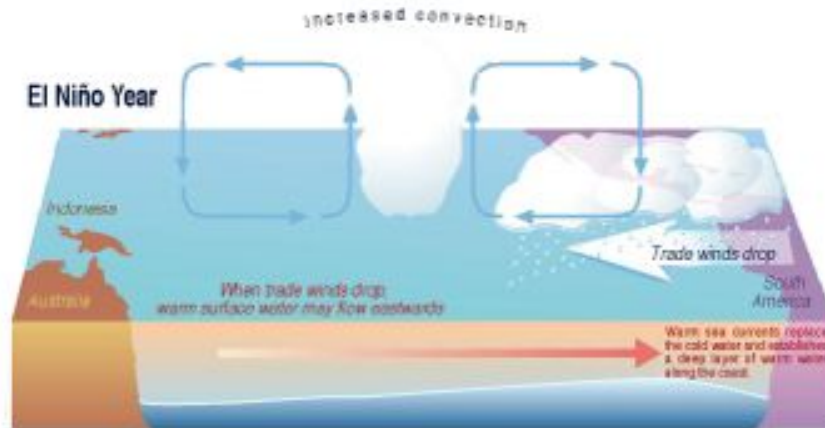
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Background

El Niño Phenomenon (ENSO)



La Nina → West Pacific → **Wet**
→ Central Pacific → **Dry**



El Nino → West Pacific → **Dry**
→ Central Pacific → **Wet**

Point Wise Correlation

ECHAM

Surface

Higher altitude

TES V5

Correlation x 100

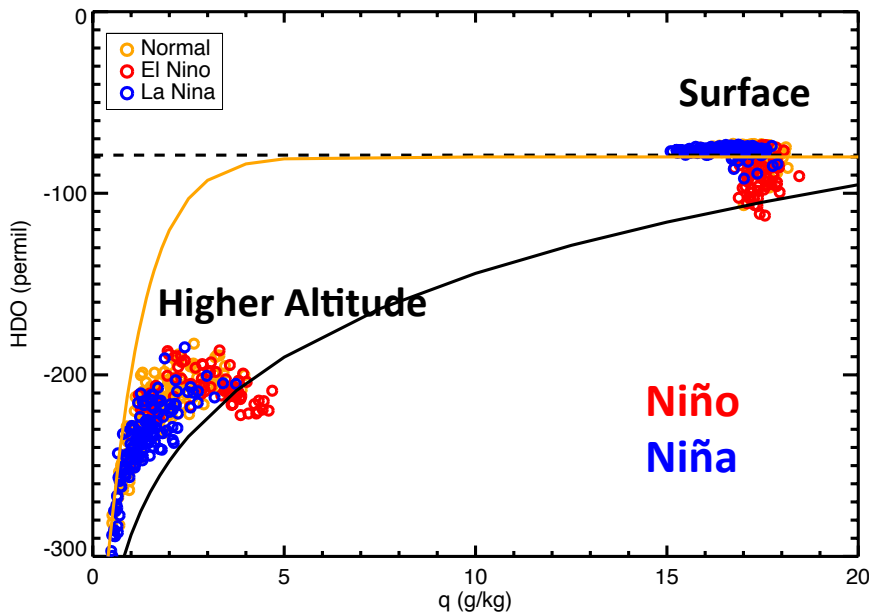


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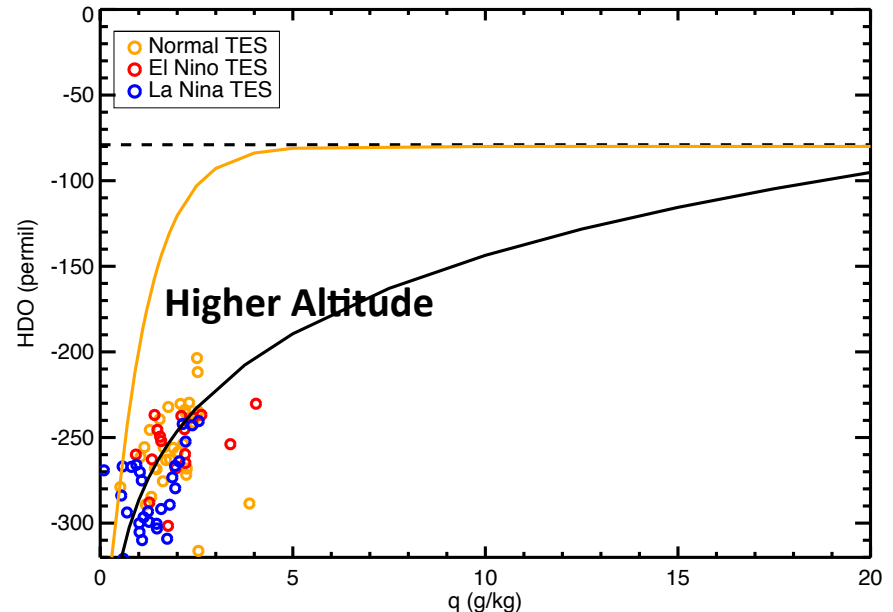


Evaporation & Condensation Central Pacific

ECHAM



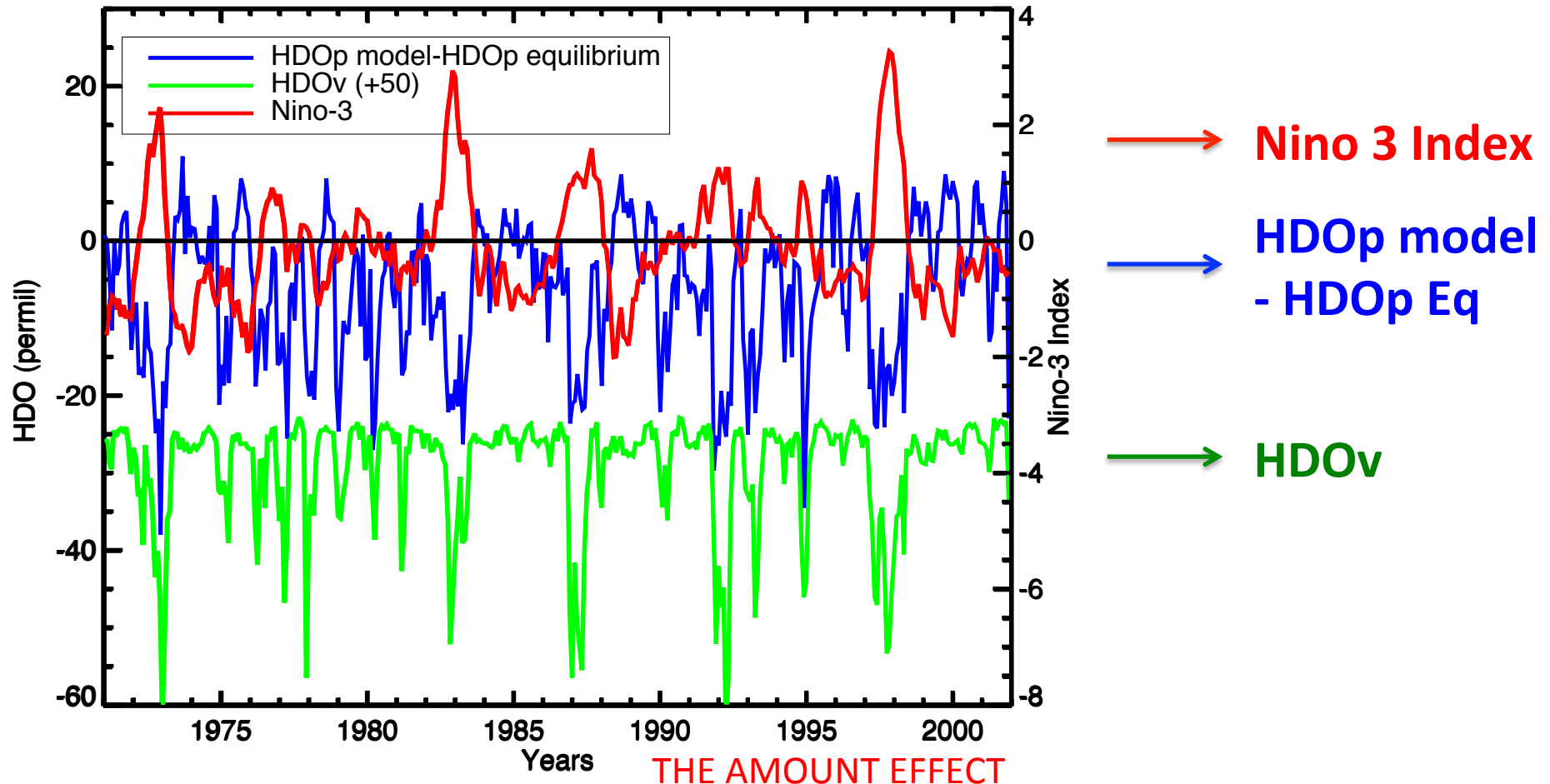
TES Satellite data



- Surface = condensation process during El Nino (wet) & Evaporation during La Nina (dry) in agreement with **the amount effect**
- Higher altitude = enriched and wetter vapor during El Nino and more depleted during La Nina
- TES satellite also shows the same signature at higher altitude



“The Amount Effect” Central Pacific



High ENSO (wet) →

Rainout, Weak rain evap and strong convective updrafts

→ δD_p -diff is far from equilibrium

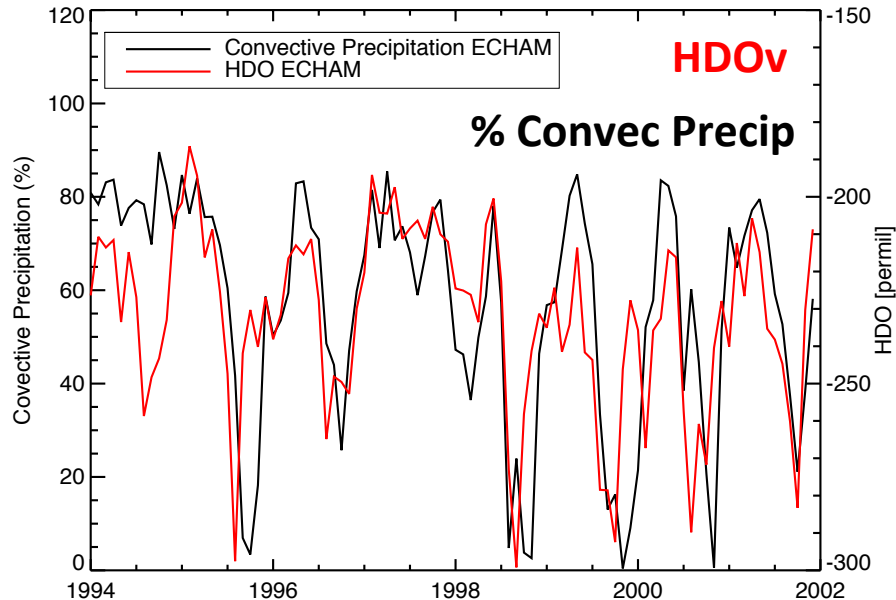


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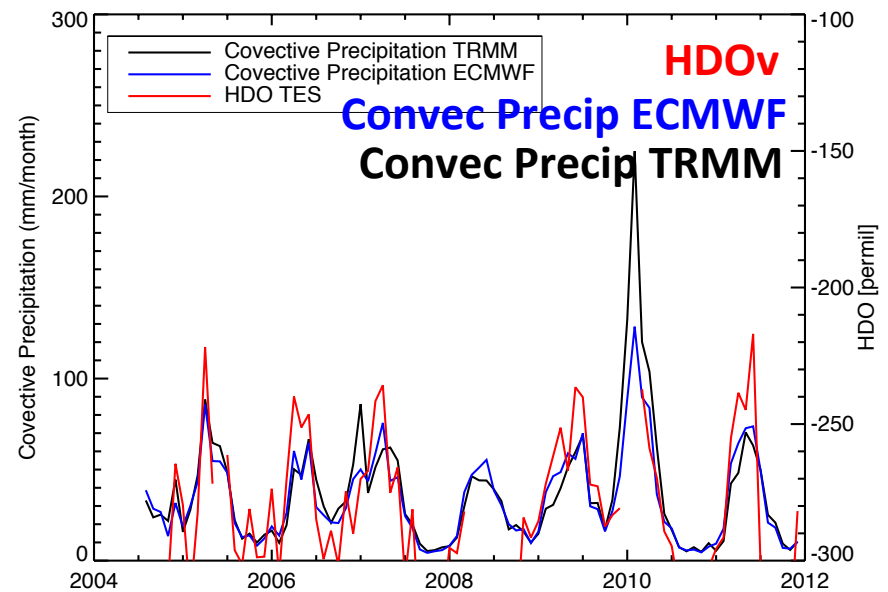


Convective updrafts

Central Pacific



Model



Nature

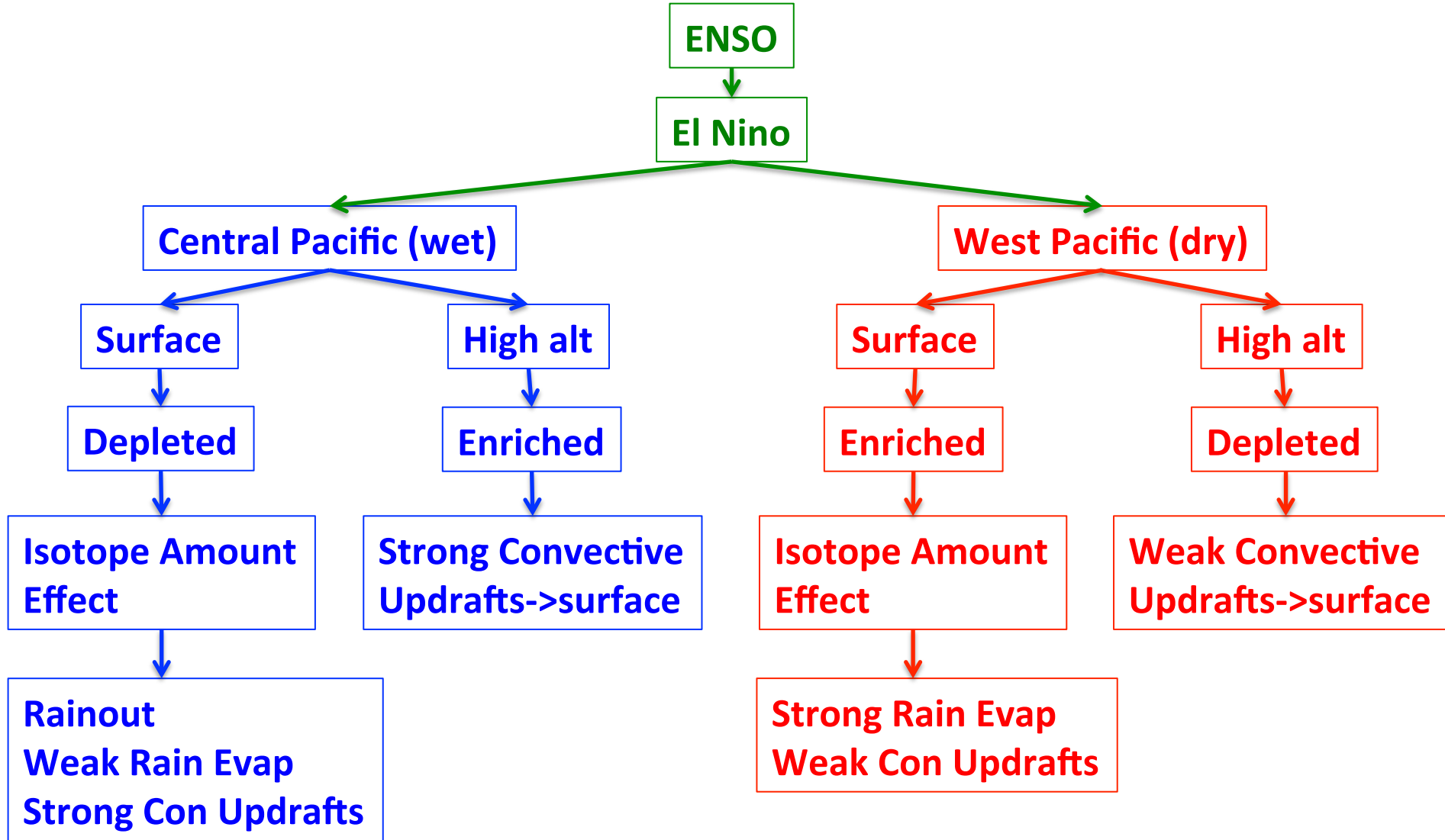
Model => correlation between δD_v and **percentage** of convective precipitation (0.63).

Nature => Correlations of δD_v and the **amount** of convective precipitation from TES and ECMWF (0.83).

Correlations from TES and TRMM (0.72).



Conclusion



Thanks for your attention

