Water isotopes during CINDY/DYNAMO
LMDZ processes and IASI data

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VOASSY meeting, Paris

June 19, 2013
Outline

Motive

Isotopic composition during case November 2011

Comparison of LMDZ ‘old’ and ‘new’ physics processes

Conclusion and perspective
Stable isotopes and cloud processes

Figure 1: Convective and cloud processes affecting the isotopic composition (Risi and Bony 2011).
Isotopic signature during MJO phases

(Camille Risi)
Case November 2011: IASI and LMDZ,AP
Case November 2011: IASI and LMDZ,NP
Case November 2011: IASI and LMDZ, AP
Case November 2011: IASI and LMDZ,NP
Comparison of LMDZ processes

Relative HDO enrichment (permil) for IASI and LMDZ (10S-10N, 80E, 600hPa)

Precip and cloud fraction for LMDZ runs (10S-10N, 80E, 600hPa)
Comparison of LMDZ processes (AP)

HDO tendencies in LMDZ,AP (permil/day) (10S–10N, 80E, 600hPa)

- Convective
- Large scale condensation
- Dynamical

HDO tendencies in convective scheme in LMDZ,AP (permil/day) (10S–10N, 80E, 600hPa)

- Convection (total)
- Rain re-evaporation
- Unsat. downdrafts
- Compensating subsidence
- Detrainment

Dates: Nov 2011

Days: 13 Nov, 15 Nov, 17 Nov, 19 Nov, 21 Nov, 23 Nov, 25 Nov, 27 Nov, 29 Nov, 1 Dec, 3 Dec, 5 Dec, 7 Dec, 9 Dec
Comparison of LMDZ processes (NP)

HDO tendencies in LMDZ, NP (permil/day) 
(10S-10N, 80E, 600hPa)

HDO tendencies in convective scheme in LMDZ, NP (permil/day) 
(10S-10N, 80E, 600hPa)
Conclusion (from initial results)

- Collocated satellite isotope data with LMDZ
- LMDZ describes isotopic dynamics reasonably well
- New physics is improvement over old physics
- Using isotopes, we can determine the source of the moistening processes and the sinks of the drying processes.
1. Collocate IASI-isotope, IASI-cloud, LMDZ-output (and other data from CINDY-DYNAMO?)
2. Study spatial structure of isotopic composition around convective systems
3. Determine role of degree of aggregation of convection on isotopic structure
4. Create composite MJO events and study isotopic structure
5. Evaluate and improve parametrizations of convective processes