

Water isotopes during CINDY/DYNAMO

LMDZ processes and IASI data

Obbe Tuinenburg

Camille Risi, Sandrine Bony, Catharine Rio, Jean-Lionel Lacour

LMD, Jussieu
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Outline

Motive

Isotopic composition during case November 2011

Comparison of LMDZ 'old' and 'new' physics processes

Conclusion and perspective

Stable isotopes and cloud processes

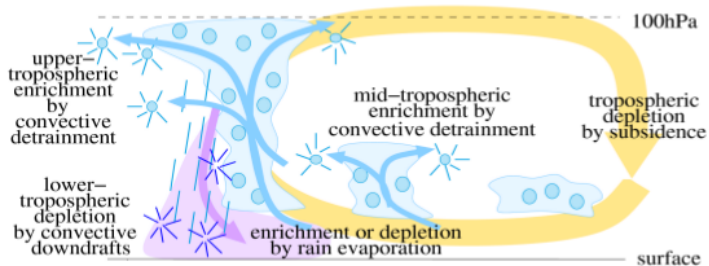
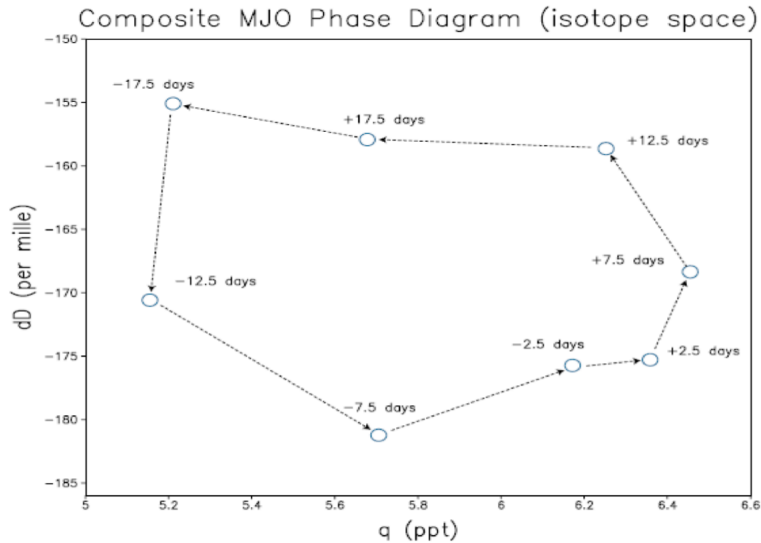


Figure 1 : Convective and cloud processes affecting the isotopic composition (Risi and Bony 2011).

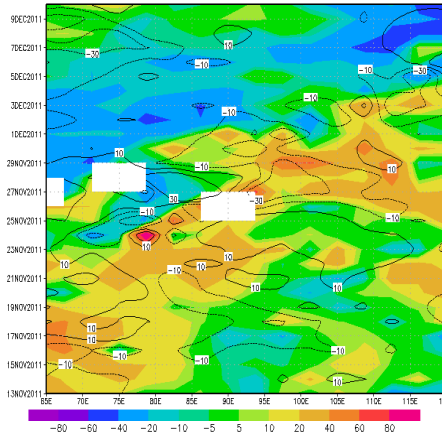
Isotopic signature during MJO phases



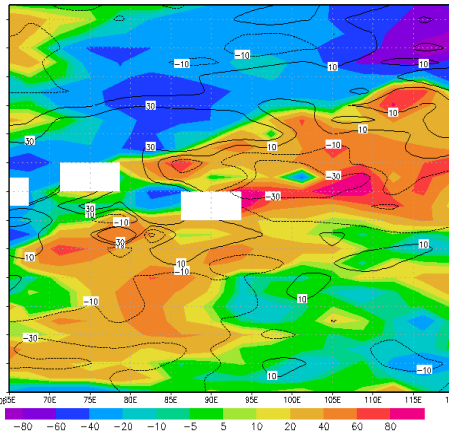
(Camille Risi)

Case November 2011: IASI and LMDZ,AP

IASI HDO depletion anomaly (permil) at 500 hPa

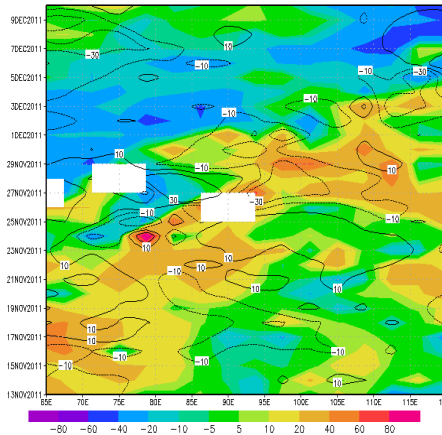


LMDZ,AP HDO depletion anomaly (permil) at 500 hPa

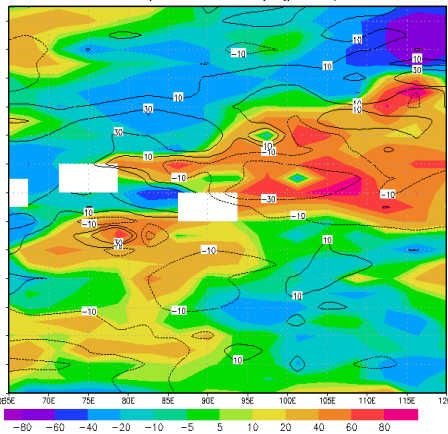


Case November 2011: IASI and LMDZ, NP

IASI HDO depletion anomaly (permil) at 500 hPa



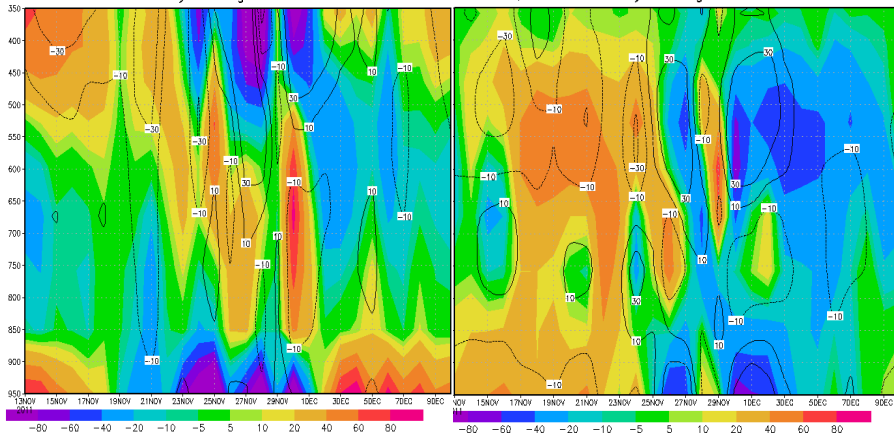
LMDZ, NP HDO depletion anomaly (permil) at 500 hPa



Case November 2011: IASI and LMDZ,AP

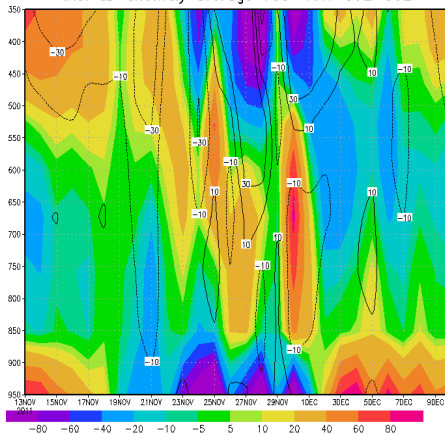
IASI dD anomaly average 10S-10N-80E-85E

LMDZ,AP dD anomaly average 10S-10N-80E-85E

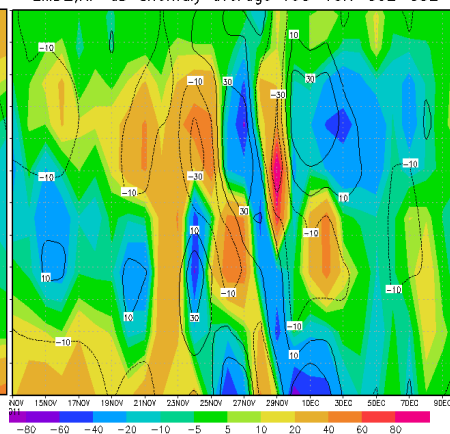


Case November 2011: IASI and LMDZ, NP

IASI dD anomaly average 10S-10N-80E-85E

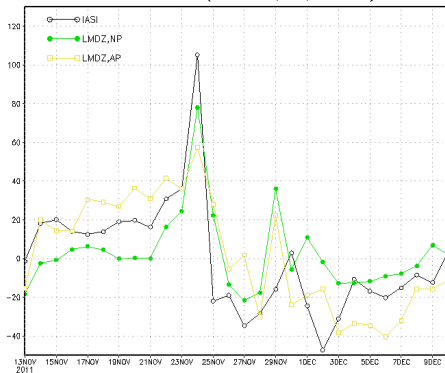


LMDZ, NP dD anomaly average 10S-10N-80E-85E

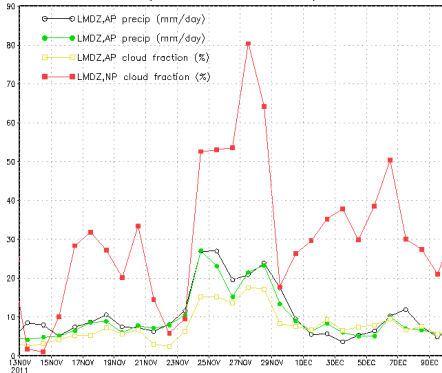


Comparison of LMDZ processes

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

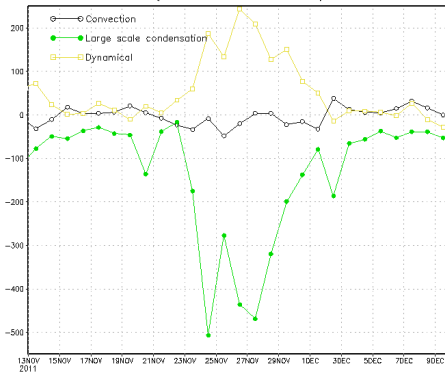


Precip and cloud fraction for LMDZ runs (10S-10N,80E, 600hPa)

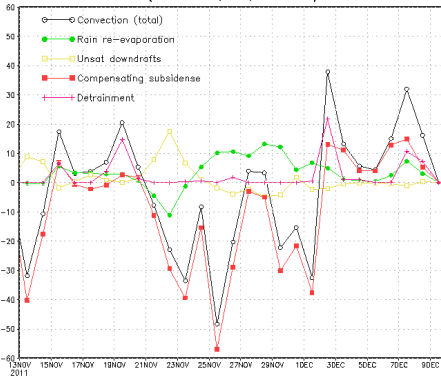


Comparison of LMDZ processes (AP)

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

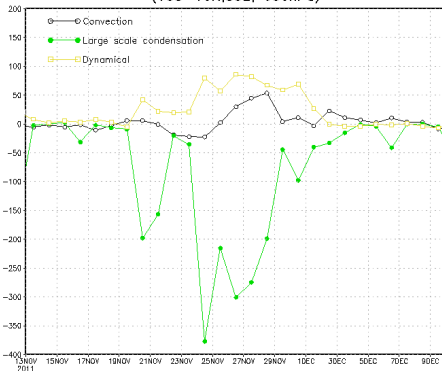


HDO tendencies in convective scheme in LMDZ,AP (permil/day)
(10S-10N,80E, 600hPa)

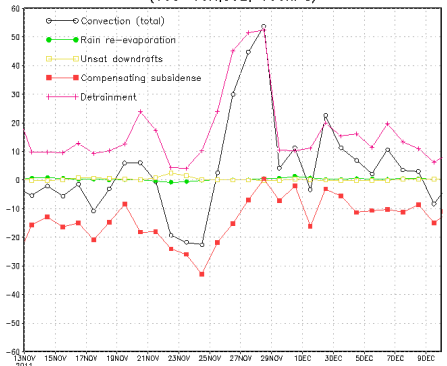


Comparison of LMDZ processes (NP)

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.

Perspective

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