README for water isotopologues data (HDO and $H_2^{18}O$) obtained from R/V MIRAI
(as of 30 March, 2013)

Data owners:

Naoyuki Kurita (University of Nagoya)

Cruise Code:

MR11-07

Observation Method:

Following observation was carried out throughout this cruise.

1) Ambient air sampling

Ambient air sampling was conducted using both latest laser based water vapor isotope instrument and conventional cryogenic cold trap method. Two air-sampling lines connected at the middle level (20m above the sea level) of the mast at the compass deck to the laboratory (~20-m-long). Air was drawn by external pump at a flow rate of 2 Lmin-1 for laser instrument and 1.5Lmin-1 for cold trap method.

As for laser-based measurement, water vapor isotope analyzer (WVIA) with the vaporization system of a liquid water standard (WVISS) from Los Gatos Research (LGR) Inc. was used for this study and obtained data was converted into a δ value (δD and δO) with respect to the international standard Vienna Standard Mean Ocean Water (V-SMOW) following the calibration procedure described in Kurita et al., 2012. Data was archived from 03 Nov 2011 to 01 Dec 2011.

Water vapor sampling using the cold trap method and the isotopic analysis was carried out using the procedure described in Kurita et al., 2011 and Kurita, 2012.

2) Rainwater sampling

Rainwater samples gathered in rain/snow collector were collected just after precipitation events have ended. The collected sample was then transferred into glass bottle (6ml) immediately after the measurement of precipitation amount. The isotopic analysis was done as same as the collected water using the cold trap method.

3) Surface seawater sampling

Seawater sample taken by the pump from 4m depth were collected in glass bottle (6ml) around the noon at the local time. The isotopic analysis was done as same as the collected water using the cold trap method.

\#   Remarks.
\#   Currently, seawater data are not available.
\#   It is expected to be released no later than December 31, 2013.

Data Format:

1) Ambient air data obtained from the laser-based instrument (WVIA from LGR)

ASCII comma delimited format in "mr1107_water_isotopes_laser.csv".

　　a) date and time [UTC] (yyyy-mm-dd hh:mm:ss)

　　b) 10 min averaged H2O concentration (ppmv) calculated from 1 Hz data

　　c) standard deviation for H2O concentration

　　d) 10 min averaged δD (V-SMOW scale)

　　e) standard deviation for δD

　　f) 10 min averaged δO (V-SMOW scale)

　　g) standard deviation for δO

2) Ambient air data obtained from the cold trap method

ASCII comma delimited format in "mr1107_water_isotopes_trap.csv". The meteorological data was calculated from SOJ and SOAR data of R/V Mirai.

　　a) starting date and time of a sampling [UTC] (yyyy-mm-dd hh:mm:ss)

　　b) latitude at starting time [N]

　　c) longitude at starting time [E]

　　d) finishing date and time of a sampling [UTC] (yyyy-mm-dd hh:mm:ss)

　　e) latitude at finishing time [N]

　　f) longitude at finishing time [E]

　　g) averaged surface air temperature during the sampling [degree C]

　　h) averaged relative humidity during the sampling period [percent]

　　i) averaged mixing ratio during the sampling period [g/Kg-air]

　　j) averaged U-wind during the sampling period [m/sec]

　　k) averaged V-wind during the sampling period [m/sec]

　　l) averaged sea surface temperature during the sampling period [degree C]

　　m) δD value of cold trapped sample

　　n) δO value of cold trapped sample

3) Rainwater data

ASCII comma delimited format in "mr1107_precip_isotopes.csv". The meteorological data was calculated from SOJ and SOAR data of R/V Mirai.

　　a) starting date and time of a sampling [UTC] (yyyy-mm-dd hh:mm:ss)

　　b) latitude at starting time [N]

　　c) longitude at starting time [E]

　　d) finishing date and time of a sampling [UTC] (yyyy-mm-dd hh:mm:ss)

　　e) latitude at finishing time [N]

f) longitude at finishing time [E]

g) averaged surface air temperature during the sampling [degree C]

h) total precipitation amount [mm]

i) δD value of precipitation

j) δO value of precipitation

4) Surface seawater data (Currently, not available)

ASCII comma delimited format in "mr1107_seawater_isotopes.csv". The meteorological data was calculated from SOJ data of R/V Mirai.

a) date and time of a sampling [UTC] (yyyy-mm-dd hh:mm:ss)

b) latitude [N]

c) longitude [E]

d) sea surface temperature[degree C]

e) sea surface salinity[permil]

i) δD value of sea surface water

j) δO value of sea surface water

Contact Point:

Kunio Yoneyama (yoneyamak [at] jamstec.go.jp)

References

Kurita, N., B.D. Newman, L.J.Araguas-Araguas, and P. Aggarwal,, Evaluation of continuous water vapor dD and d^{18}O measurements by off-axis integrated cavity output spectroscopy, Atmos. Meas. Tech., 5, 2012, 2069-2080

Kurita, N., D. Noone, C. Risi, G.A. Schmidt, H. Yamada, and K. Yoneyama, Intraseasonal isotopic variation associated with the Madden-Julian Oscillation, J. Geophys. Res., 116, 2011, doi:10.1029/2010JD015209.

Kurita, N., Water isotopic variability in response to the mesoscale convection systems over the tropical ocean, J. Geophys. Res., (Under review)