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1. General Information

Site name (three letter code)	Narita Flux Research Site (NRT)
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Other Researchers (e-mail)	[Flux and micrometeorology] Akinobu Mayumi (crown@env.ccc.ac.jp) [Soil respiration] Kozo Kawato (harudanji@bbb.ccc.ac.jp) [Soil respiration] Randy William Bass (suketto@ddd.eee.ac.jp) [General] Masayuki Kakehu (narashino@env.ccc.ac.jp)
Observation period	September 2000 to September 2004
Measurement frequency	Continuous
Infrastructure	Tower, Electrical power(AC), Facilities for communication(none), Accommodation (none)
Research fund #1	Grant-in-Aid for Scientific Research (Nos.12345878, 87654321 and 77777777) from the Japanese Ministry of Education, Culture, Sports, Science and Technology, Japan (FY2001-2009)
Research fund #2	
Research fund #3	

URL	URL : http://www.narita.co.jp
Other information	

2. Site description

Site name (three letter code)	Narita Flux Research Site (NRT)
Country	Japan
Location	Narita, Chiba
Latitude and Longitude (first decimal of second precision), Elevation (geographic coordinates, surveying method)	44°44'4.4"N, 111°11'1.1"E (140 m above sea level) ((World Geodetic System 1984, GPS: Garmin GPSMAP60CS and map)
Slope	1-2deg
Terrain Type	Flat
Area	117ha
Fetch	300-800m
Climate (Köppen Climate Classification)	Cool temperate (Snow – fully humid – warm summer (Dfb))
Mean annual air temperature	6.2 degC (2001-2003)
Mean annual precipitation	1043 mm (2001-2003)
Vegetation Type	Japanese larch forest
Dominant Species (Overstory)	Japanese larch (<i>Larix Kaempferi</i> Sarg.), Birch (<i>Betula ermanii</i> and <i>Betula platyphylla</i>), Japanese elm (<i>Ulmus japonica</i>), Spruce (<i>Picea jezoensis</i>)
Dominant Species (Understory)	Fern (<i>Dryopteris crassirhizoma</i> , <i>Dryopteris austriaca</i>) <i>Pachysandra terminalis</i>
Canopy height	About 15m
Age	About 100 years old
LAI	9.2 m ² m ⁻² (max) (Overstory: 5.6 m ² m ⁻² , Understory: 3.6 m ² m ⁻²)
Soil type	Volcanogenous regosol

3. Measurement Item

3-1. Meteorology

Observation items	Levels / Depth	Instrument
Global solar radiation (incoming)	41, 18, 14, 5, 1.5 (six points) m 40, 18, 1.5 m	Pyranometer (MS-601, Eko, Japan) Radiometer (MR40, Eko, Japan)
Global solar radiation (outgoing)	40, 18, 1.5 m	Radiometer (MR40, Eko, Japan)
Long-wave radiation (incoming)	40, 18, 1.5 m	Radiometer (MR40, Eko, Japan)

Long-wave radiation (outgoing)	40, 18, 1.5 m	Radiometer (MR40, Eko, Japan)
Net radiation	40, 18, 1.5 m	Radiometer (MR40, Eko, Japan)
PPFD (incoming)	40, 18, 5, 1.5 (three points) m	Quantum sensor (LI-190S, LI-COR)
PPFD (outgoing)	40 m	Quantum sensor (LI-190S, LI-COR)
Direct/diffuse radiation	40 m	Pyranometer (MS-601, Eko, Japan), Rotating shadow blade (PRB-100, PREDE, Japan)
Direct/diffuse PPFD	40 m	Quantum sensor (LI-190S, LI-COR), shadow blade (PSB-100, PREDE, Japan)
Air temperature	40, 27, 22, 18, 14, 8, 5, 1.5 m	Platinum resistance thermometer and capacitive hygrometer (HMP45D, Vaisala)
Humidity	40, 27, 22, 18, 14, 8, 5, 1.5 m	Platinum resistance thermometer and capacitive hygrometer (HMP45D, Vaisala)
Soil temperature	0, 0.05, 0.1, 0.2, 0.5 m (three points)	Platinum resistance thermometer
Soil heat flux	0.05 m (five points)	Heat flux plate (MF-81, Eko, Japan)
Soil water content	0.05 (three points), 0.1 (two points) m	TDR sensor (CS615, Campbell)
Wind speed	40, 27, 23, 18, 14, 8.0, 5.0, 1.5 m	Sonic anemometer (MA-130A, Eko, Japan)
Wind direction	40, 27, 23, 18, 14, 8.0, 5.0, 1.5 m	Sonic anemometer (MA-130A, Eko, Japan)
Barometric pressure	40, 18, 8, 5 m	Barometer (PTB100, Vaisala)
Precipitation	41, 1.5 (three points) m	Tipping-bucket raingauge with heater (52 202, R. M. Young)
CO ₂ concentration	41, 38, 32, 26, 22, 16, 12, 6, 3, 1 m	Closed-path CO ₂ /H ₂ O analyzer (LI-6262, LI-COR)

3-2. Eddy covariance method (CO₂)

System	Open- and closed-path system (CO ₂ flux, latent heat flux)
Wind speed	Three-dimensional sonic anemometer-thermometer (DA600-3TV (Probe TR-61C), KAIJO)
Air temperature	Three-dimensional sonic anemometer-thermometer (DA600-3TV (Probe TR-61C), KAIJO)
Water vapor	Open- and Closed-path CO ₂ /H ₂ O analyzers (LI-7500 and LI-6262, LI-COR)
CO ₂	Open- and Closed-path CO ₂ /H ₂ O analyzers (LI-7500 and LI-6262, LI-COR)
Measurement height	27 and 42 m
Sampling frequency	10 Hz
Averaging time	30 min
Data logger	DRM3a, TEAC, Japan
Data storage	MO

Original data (Raw data or statistics)	Raw data

3-4. Fluxes of non-CO₂ gases

Gas	CH ₄ , N ₂ O, O ₃ , BVOC...
Method	CH ₄ (OPEC, CPEC, REA, HREA, FG, Chamber) N ₂ O (CPEC, Chamber), O ₃ (EC), BVOC (HREA)...
Measurement height	CH ₄ (24m) N ₂ O (0 m), O ₃ (24m), BVOC (12m)...
Data logger	Campbell CR3000, USA
Data storage	Flash memory

3-4. Soil respiration

Measurement method	Open-flow (OF) IRGA chamber method (Steady state flow-through method)
Reference(s) for method (if have)	Asiaflux et al. (2000) Ecol. Res. 15: 363-372
Measuring system	OF system (own-making by investigator)
IRGA	Li-6252
Flow control	Flowmeter (rotameter)
Chamber type	OF chamber
Chamber size	PVC chamber, 18-cm internal diameter, 15-cm in height
Number of chambers	8
Measuring intervals	Uncontinuous; Every or twice measurements for one month;
Is the ground covered by snow in winter? (if yes, how about the measurement in winter?)	Yes. Measuring snow surface CO ₂ efflux by improved OF method
Original data (Raw data or statistics)	Raw data
Temperature and air pressure correction (if done, which temperature was used?)	Yes Site air temperature (180 cm above ground) used Air pressure estimated by elevation None correction for flow control

3-5. Other

Photosynthesis	Occasionally
Ecological Investigation	Tree heights, stand density, diameter, biomass, LAI (1999, 2001, 2003)

4. Note (e. g. calibration information, Publications)

Calibration information

Open-path analyzers were calibrated approximately every two months with standard CO₂ gases and a dew point generator (LI610, LI-COR).

The gain of CO₂ of the closed-path analyzers was checked once a day by flowing two standard CO₂ gases of 320 ppmv and 420 ppmv that were automatically controlled using a CR23X (LI-COR).

Publications

Yoshida, Y., Hoshino, S., Okada, A and Nomura, K. 2015. CO₂ and water vapor exchange of Narita flux research site. Agric. For. Meteor., 99999: 9999–999999.