

ETL FLUX DATA BASE
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The following is basic information on a subset of air-sea flux data from a series of ETL cruises conducted since 1991 (<http://www7.etl.noaa.gov/programs/index.html>). A summary is given in Table 1. The majority of the cruises are from conventional research ships but two are from R/P FLIP (SCOPE and MBL) and another is from a 20-m tower set up on the arctic sea ice (SHEBA). We have attempted to provide a reference for each experiment, although some will need to be obtained from web or ftp sites. With the exception of SHEBA, all data were taken with the ETL seagoing flux system: TIWE through MBL with the first generation system and CSP onward with the second generation system. The second generation system is more ruggedized and automated, but does not deliver superior fluxes (at least, not yet). All cruises feature direct covariance (ship-motion corrected) momentum, sensible heat, and latent heat fluxes except CSP where there was a logging problem with the high speed data. All cruises also feature very good bulk meteorological variables and LW and SW radiative fluxes. A few (GASEX-98 and JASMINE) have covariance measurements of CO₂ fluxes. The MBL and Moorings cruises do not have rawinsondes. All cruises except SCOPE, JASMINE, and GASEX98 have cloud ceilometer information. We have also included a list of measurement/instrument references; Fairall et al. (1998) and Edson et al. (1998) are the best summary references for the measurements.

We are presently developing an ftp site with information on our experiments and the COARE bulk algorithm: <ftp://ftp.etl.noaa.gov/pub/et7/users/cwf/>. Some of the subdirectories of interest to this group are:

epic/epicmonitor	Data and descriptions for the series of stratocumulus cloud cruises conducted in the Eastern equatorial Pacific.
bulkalg	Code and test data for the COARE bulk algorithm
clouforce	Graphs and text on cloud forcing of surface fluxes from SHEBA
fluxdata	Documentation and ascii data files from a few ETL cruises
jasmine	Data and documentation from the JASMINE experiment.

Work is underway to process and quality control remaining flux data from recent cruises. When this is complete, we will begin to prepare the fluxdata site to make the data described Table 1 available. For each cruise we will supply the flux and high quality bulk meteorological data in a common format (something like the format found in the data already available). Rawinsondes will also be supplied.

Table 1. Summary of Recent ETL flux cruise data. A circle implies the data exists but has not yet been processed/quality controlled.

Project	Time	Lat./Lon	Direct Turb.	Waves	Reference
TIWE	11/91 12/91	0 140W	X		Chertock et al. 1993
ASTEX	06/92 06/92	27-37 N 22-27 W	X		White et al. 1995
COARE	11/92 02/93	2S - 2 N 153-157 E	X		Fairall et al. 1996
SCOPE	09/93 09/93	33N 118 W	X	X	Edson and Fairall 1998
MBL	04/95 04/95	36.5 N 122.5 W	X	O	Edson et al. 1998
CSP	04/96 05/96	14 S - 20 N 160W - 147E			Post et al. 1997
FASTEX	12/96 1/97	42 N - 52 N 5 W - 60 W	X	X	Hare et al. 1999
SHEBA	11/97 9/98	74 N 81 N 142W - 164W	X	NA	Persson et al. 2000
GASEX98	5/98 6/98	46 N 21 W	X	O	Fairall et al. 2000a
JASMINE	5/99 6/99	5 S- 13 N 88 E - 98 E	O		Webster et al. 2000
NAURU99	6/99 7/99	12 S - 8 N 130 E -160 E	O		Fairall et al. 2000b
KWAJEX	7/99 9/99	8.8 N 167.7 E	O		Hare et al. 2000
MOORINGS	9/99 10/99	25 N - 55 N 120W-170W	O		Hare et al. 2000
EPIC_F99	11/99 12/99	12 N - 8 S 112W - 95 W	O		Hare et al. 2000

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CRUISE DESCRIPTIONS BY ET7 AIR-SEA INTERACTION GROUP

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Tropical Instability Wave Experiment (TIWE)

Study waves propagating on the ocean thermocline (40-50 day period)

November 1991, Equatorial Pacific just east of Christmas Island

R/V Moana Wave

30 days at sea

Other participants: Mike Greg (UW) with ocean microstructure.

No aircraft

Atlantic Stratocumulus Transition Experiment (ASTEX)

Study transition from marine stratus to trade cumulus

June 1992, Azores region of Atlantic

R/V Malcom Baldrige

30 days at sea

Other participants: numerous groups from AOML, CMDL, etc

Aircraft involved: NCAR Electra, British Met. Office C-130, NASA ER-2, UW C-131

TOGA Couple Ocean Atmosphere Response Experiment (COARE)

Ocean response to deep convection, El Nino, air-sea interaction

November 1992-February 1993, Equatorial Pacific

R/V Moana Wave

70 days at sea, three cruise legs

Other participants: George Young, Penn State; Jim Edson, WHOI; Mike Gregg, UW; Jim Moun, OSU; Roger Lukas, UH.

Aircraft involved: NCAR Electra, 2 NOAA P-3, Flinders University Cessna, British Met Office C-130

San Clemente Ocean Probing Experiment (SCOPE)

Radar signatures of internal waves, wind-wave coupling

September 1993, off S. California

R/V Titan and R/P Flip

15 days at sea, each vessel

Other participants: Scripps Institution of Oceanography, NRaD.

Aircraft involved: NOAA small aircraft with Len Fedor, etc.

Marine Boundary Layers Experiment (MBL)

Study of dynamics of coupled ocean-atmosphere processes

March 1995, Oregon and N. California Coast

R/V Wecoma

30 days at sea

Other participants: Rolf Lueck and Dave Farmer, UBC; Jim Edson, WHOI

Aircraft involved: NOAA ARL Longeze

Coastal Ocean Probing Experiment (COPE)

Study dynamics and signatures of internal waves at the coast

September 1995, Oregon coast

R/P Flip and M/V Snowgoose

20 days at sea on Flip, 25 days on Snowgoose

Other participants: T. Stanton, NPS; A. Jessup, UW; R. Chapman, JHUAPL; J. Edson and E.

Bock, WHOI; T. Hara, URI; M. Trevorrow, UBC; G. Wick, CU

Aircraft involved: Blimp, NASA DC-8, NOAA twin otter?

Combined Sensor Program (CSP)

Study clouds and radiative transfer in the tropical western Pacific <http://www4.etl.noaa.gov/csp/>

April 1996, TWP

R/V Discoverer

30 days at sea

Other participants: see ET4 web site

Aircraft involved: none

Fronts and Atlantic Storm Tracks Experiment (FASTEX)

Storm generation in the N. Atlantic. Some strong winds.

January 1997, N. Atlantic

R/V Knorr

40 days at sea

Other participants: K. Katsaros, IFREMER; D. Trizna, NRL; M. LeMone, NCAR

Aircraft involved: British C-130; NOAA Gulfstream; French Merlin

Surface Heat Budget of the Arctic (SHEBA)

Air-Ice interaction, ice-cloud albedo feedback physics.

<http://www.met.nps.navy.mil/~guestps/sheba/>

October 1997-October 1998, Beaufort Sea (300 km N. Prudhoe Bay, AK)

Icebreaker Des Groseilliers

12 months on the ice

Other participants: NASA FIRE-III program and DOE ARM program. About 12 science groups on the ice.

Aircraft involved: Canadian CV-580, UW CV-580, NCAR C-130, NASA ER-2

Gas Exchange Experiment (GASEX-98)

Air-Sea exchange of CO₂ and other trace gases.

May-June, 1998, N. Atlantic (primarily N of the Azores)

R/V Ronald H. Brown

40 days at sea

Other participants: AOML, PMEL, WHOI, BNL, UW. Several groups measured skin temperature. Ocean chemistry and mixed layer data.

No aircraft.

Joint Air-Sea Interaction Experiment (JASMINE)

Air-sea interaction, deep convection, and ocean mixed-layer dynamics associated with monsoon variability. <http://www7.etl.noaa.gov/programs/JASMINE/>

May 1999, Bay of Bengal

R/V Ronald H. Brown

40 days at sea

Other participants: Univ. Colorado, Univ. Washington, Univ. of Hawaii, and CSIRO land and water. A pre-JASMINE cruise leg was done in April and the site was re-occupied by the R/V Franklin in September.

No aircraft.

Cloud-radiation studies near Nauru Island (NAURU99)

A study of cloud and radiation interactions in the tropical western Pacific in association with the DOE ARM site at Nauru. <http://www.etl.noaa.gov/nauru99/>

R/V Ronald H. Brown

35 days at sea

Other participants: AL, AOML, PMEL, DOE BNL, Penn State University, NCAR, Flinders University, MPI Hamburg. The JAMSTEC R/V Mirai also participated.

Aircraft: Flinders University Cessna.

TRMM Kwajalein experiment (KWAJEX)

Calibration/validation studies for the NASA Tropical Rainfall Mapping Mission (TRMM) <http://www.atmos.washington.edu/gcg/MG/KWAJ/kwajex.html>

R/V Ronald H. Brown

60 days at sea

Other participants: AL, Univ. Washington, numerous NASA labs.

Aircraft: several.

Moorings cruise

A NOAA cruise to set oceanographic moorings in the Gulf of Alaska. ETL left the flux system on and took data. Some strong winds.

R/V Ronald H. Brown

25 days at sea

Other participants: None.

No Aircraft

Eastern Pacific Investigations of Climate Processes in the Coupled Ocean-Atmosphere System (EPIC)

ETL is conducting a study of stratocumulus cloud climatology along the 110 E and 95 W TAO buoy lines. <http://www.ogp.noaa.gov/mpe/clivar/pacs/fy99/fairall/fairall99.htm>

R/V Ronald H. Brown

40 days at sea

Other participants: Nick Bond at PMEL

No aircraft.