Georges Bank Fish Larvae Data collected in Bongo Nets from R/V Albatross IV, R/V Endeavor, and R/V Oceanus during U.S. GLOBEC broadscale cruises in the Gulf of Maine and Georges Bank from 1995-1999 (GB project)

Website: https://www.bco-dmo.org/dataset/2323

Data Type: Cruise Results

Version: 1

Version Date: 2004-06-03

Project

» U.S. GLOBEC Georges Bank (GB)

Program

» <u>U.S. GLOBal ocean ECosystems dynamics</u> (U.S. GLOBEC)

| Contributors | Affiliation | Role |
|-------------------|---|------------------------|
| Johnson, Donna L. | National Marine Fisheries Service (NMFS) | Principal Investigator |
| Allison, Dicky | Woods Hole Oceanographic Institution (WHOI BCO-DMO) | BCO-DMO Data Manager |

Abstract

Georges Bank Fish Larvae Data collected in Bongo Nets from R/V Albatross IV, R/V Endeavor, and R/V Oceanus during U.S. GLOBEC broadscale cruises in the Gulf of Maine and Georges Bank from 1995-1999

Table of Contents

- Coverage
- <u>Dataset Description</u>
 - Methods & Sampling
- Data Files
- Parameters
- <u>Instruments</u>
- Deployments
- Project Information
- Program Information
- <u>Funding</u>

Coverage

Spatial Extent: N:42.325 E:-65.677 S:40.228 W:-69.142

Temporal Extent: 1995-02-10 - 1999-06-14

Dataset Description

Georges Bank Fish Larvae Data from Bongo Nets

¹Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here.

Specifics on bongo tow displacement volumes can be seen on the companion file "bongovols" under the heading of broadscale cruises.

Any questions, contact:

Donna Johnson

National Marine Fisheries Service Sandy Hook Laboratory 74 Magruder Road Highlands, NJ 07732

voice: (732) 872-3092 fax: (732) 872-3088

email: djohnson@snook.sh.nmfs.gov
updated: June 3, 2004, G.Heimerdinger

Methods & Sampling

GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here.

[table of contents | back to top]

Data Files

File

fishlarvaeB_rs.csv(Comma Separated Values (.csv), 4.69 MB) MD5:50b300b8883981340ad63b41e370e143

Primary data file for dataset ID 2323

[table of contents | back to top]

Parameters

| Parameter | Description | Units |
|-----------------|--|-----------------------|
| cruiseid | Cruise id, e.g. EN330, for Endeavor cruise 330 | |
| year | Four digit year, local time | |
| inst | Instrument identifier (Bongo versus MOCNESS-1) | |
| station_std | Standard station number on a cruise | |
| tow | Bongo plankton tow station number on a cruise | |
| lat | Latitude, at start of tow | decimaldegrees |
| lon | Longitude, at start of tow | decimaldegrees |
| month_local | Month of year (01-12), local time | |
| day_local | Day of year (01-31), local time | |
| time_local | Time at start of tow, local time | hours/minutes |
| depth_tow_max | Maximum depth of the tow | meters |
| net | Net identifier | |
| haul_factor_std | Standard Haul Factor1 | |
| taxon | Taxonomic name of larval fish species | |
| num_caught | Number of the specific fish larvae caught | number of fish caught |
| num_measure | Number of fish larvae measured | |
| fish_len | Length of each fish larvae measured | millimeters |
| num_fish_len | Number of fish larvae at that length | |

[table of contents | back to top]

Instruments

| Dataset- specific Instrument Name | Bongo Nets |
|--|---|
| Generic Instrument Name | Bongo Net |
| Dataset- specific Description | 60 cm diameter Bongo nets (0.335 millimeter mesh). |
| Description | A Bongo Net consists of paired plankton nets, typically with a 60 cm diameter mouth opening and varying mesh sizes, 10 to 1000 micron. The Bongo Frame was designed by the National Marine Fisheries Service for use in the MARMAP program. It consists of two cylindrical collars connected with a yoke so that replicate samples are collected at the same time. Variations in models are designed for either vertical hauls (OI-2500 = NMFS Pairovet-Style, MARMAP Bongo, CalVET) or both oblique and vertical hauls (Aquatic Research). The OI-1200 has an opening and closing mechanism that allows discrete "known-depth" sampling. This model is large enough to filter water at the rate of 47.5 m3/minute when towing at a speed of two knots. More information: Ocean Instruments, Aquatic Research, Sea-Gear |

[table of contents | back to top]

Deployments

| Website | https://www.bco-dmo.org/deployment/57371 |
|-------------|--|
| Platform | R/V Albatross IV |
| Report | http://globec.whoi.edu/globec-dir/reports/al9505/al9505rot.pdf |
| Start Date | 1995-05-09 |
| End Date | 1995-05-18 |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

AL9506

| ALJJUU | |
|-------------|--|
| Website | https://www.bco-dmo.org/deployment/57372 |
| Platform | R/V Albatross IV |
| Report | http://globec.whoi.edu/globec-dir/reports/al9506/al9506new.html |
| Start Date | 1995-06-05 |
| End Date | 1995-06-15 |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

AL9508

| Website | https://www.bco-dmo.org/deployment/57373 |
|-------------|--|
| Platform | R/V Albatross IV |
| Report | http://globec.whoi.edu/globec-dir/reports/al9508/a9508rp2.HTM |
| Start Date | 1995-07-10 |
| End Date | 1995-07-20 |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

| Website | https://www.bco-dmo.org/deployment/57375 |
|-------------|--|
| Platform | R/V Albatross IV |
| Report | http://globec.whoi.edu/globec-dir/reports/al9605/al9605.html |
| Start Date | 1996-05-06 |
| End Date | 1996-05-17 |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

| Website | https://www.bco-dmo.org/deployment/57376 |
|-------------|--|
| Platform | R/V Albatross IV |
| Report | http://globec.whoi.edu/globec-dir/reports/al9607/AL9607.pdf |
| Start Date | 1996-06-03 |
| End Date | 1996-06-13 |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

AL9701

| 415701 | |
|---|--|
| https://www.bco-dmo.org/deployment/57378 | |
| R/V Albatross IV | |
| http://globec.whoi.edu/globec-dir/reports/al9701/cral9701.htm | |
| 1997-01-13 | |
| 1997-01-20 | |
| broad-scale Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. | |
| | |

| Website | https://www.bco-dmo.org/deployment/57379 |
|-------------|--|
| Platform | R/V Albatross IV |
| Report | http://globec.whoi.edu/globec-dir/reports/al9705/al9705.html |
| Start Date | 1997-05-19 |
| End Date | 1997-05-27 |
| | broad-scale |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

| Website | https://www.bco-dmo.org/deployment/57380 |
|-------------|--|
| Platform | R/V Albatross IV |
| Report | http://globec.whoi.edu/globec-dir/reports/al9707/al9707.html |
| Start Date | 1997-06-18 |
| End Date | 1997-06-28 |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

AL9801

| Website | https://www.bco-dmo.org/deployment/57382 |
|-------------|--|
| Platform | R/V Albatross IV |
| Report | http://globec.whoi.edu/globec-dir/reports/al9801/al9801.html |
| Start Date | 1998-01-07 |
| End Date | 1998-01-19 |
| | broad-scale |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

| Website | https://www.bco-dmo.org/deployment/57384 |
|-------------|--|
| Platform | R/V Albatross IV |
| Report | http://globec.whoi.edu/globec-dir/reports/al9806/al9806.html |
| Start Date | 1998-05-13 |
| End Date | 1998-05-22 |
| | broad-scale |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

| Website | https://www.bco-dmo.org/deployment/57385 |
|-------------|--|
| Platform | R/V Albatross IV |
| Report | http://globec.whoi.edu/globec-dir/reports/al9808/al9808.html |
| Start Date | 1998-06-16 |
| End Date | 1998-06-26 |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

AL9901

| Website | https://www.bco-dmo.org/deployment/57386 |
|-------------|--|
| Platform | R/V Albatross IV |
| Report | http://globec.whoi.edu/globec-dir/reports/al9901/al9901.html |
| Start Date | 1999-01-12 |
| End Date | 1999-01-24 |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

| Website | https://www.bco-dmo.org/deployment/57387 |
|-------------|--|
| Platform | R/V Albatross IV |
| Start Date | 1999-05-19 |
| End Date | 1999-05-27 |
| | broad-scale |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

| Website | https://www.bco-dmo.org/deployment/57388 |
|-------------|--|
| Platform | R/V Albatross IV |
| Report | http://globec.whoi.edu/globec-dir/reports/al9906/al9906rpt.html |
| Start Date | 1999-06-14 |
| End Date | 1999-06-24 |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

EN261

| Website | https://www.bco-dmo.org/deployment/57401 |
|-------------|--|
| Platform | R/V Endeavor |
| Start Date | 1995-02-10 |
| End Date | 1995-02-20 |
| | broad-scale |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

EN263

| Website | https://www.bco-dmo.org/deployment/57403 |
|-------------|--|
| Platform | R/V Endeavor |
| Report | http://globec.whoi.edu/globec-dir/reports/en263/EN263.pdf |
| Start Date | 1995-03-13 |
| End Date | 1995-03-24 |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

EN265

| Website | https://www.bco-dmo.org/deployment/57405 |
|-------------|--|
| Platform | R/V Endeavor |
| Start Date | 1995-04-11 |
| End Date | 1995-04-22 |
| | broad-scale |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

EN276

| ENZ/0 | |
|-------------|--|
| Website | https://www.bco-dmo.org/deployment/57413 |
| Platform | R/V Endeavor |
| Report | http://globec.whoi.edu/globec-dir/reports/en276/EN276.pdf |
| Start Date | 1996-01-10 |
| End Date | 1996-01-22 |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

EN278

| Website | https://www.bco-dmo.org/deployment/57414 |
|-------------|--|
| Platform | R/V Endeavor |
| Start Date | 1996-02-13 |
| End Date | 1996-02-25 |
| | broad-scale |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

EN282

| Website | https://www.bco-dmo.org/deployment/57415 |
|-------------|--|
| Platform | R/V Endeavor |
| Start Date | 1996-04-08 |
| End Date | 1996-04-20 |
| | broad-scale |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. |

EN320

| LINGEO | :11320 | |
|-------------|---|--|
| Website | https://www.bco-dmo.org/deployment/57427 | |
| Platform | R/V Endeavor | |
| Report | http://globec.whoi.edu/globec-dir/reports/en320new/en320mda.htm | |
| Start Date | 1999-03-10 | |
| End Date | 1999-03-23 | |
| Description | broad-scale Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. | |

OC275

| Website | https://www.bco-dmo.org/deployment/57440 | |
|-------------|--|--|
| Platform | R/V Oceanus | |
| Start Date | 1996-03-11 | |
| End Date | 1996-03-22 | |
| | broad-scale | |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. | |

OC298

| Website | https://www.bco-dmo.org/deployment/57444 | |
|-------------|--|--|
| Platform | R/V Oceanus | |
| Report | http://globec.whoi.edu/globec-dir/reports/oc298/cruisereport.html | |
| Start Date | 1997-02-11 | |
| End Date | 1997-02-23 | |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. | |

OC300

| 00300 | | |
|-------------|--|--|
| Website | https://www.bco-dmo.org/deployment/57446 | |
| Platform | R/V Oceanus | |
| Report | http://globec.whoi.edu/globec-dir/reports/oc300/oc300rpt.mr7.html | |
| Start Date | 1997-03-16 | |
| End Date | 1997-03-28 | |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. | |

OC302

| Website | https://www.bco-dmo.org/deployment/57448 | |
|-------------|--|--|
| Platform | R/V Oceanus | |
| Report | http://globec.whoi.edu/globec-dir/reports/oc302/oce302.html | |
| Start Date | 1997-04-22 | |
| End Date | 1997-05-02 | |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. | |

OC317

| Website | https://www.bco-dmo.org/deployment/57451 | |
|-------------|--|--|
| Platform | R/V Oceanus | |
| Start Date | 1998-02-06 | |
| End Date | 1998-02-19 | |
| | broad-scale | |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. | |

OC319

| 00319 | | |
|-------------|--|--|
| Website | https://www.bco-dmo.org/deployment/57452 | |
| Platform | R/V Oceanus | |
| Report | http://globec.whoi.edu/globec-dir/reports/oc319/oc319new/oc319rpt.8april98.htm | |
| Start Date | 1998-03-15 | |
| End Date | 1998-03-27 | |
| | broad-scale | |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. | |

OC322

| Website | https://www.bco-dmo.org/deployment/57454 | |
|-------------|--|--|
| Platform | R/V Oceanus | |
| Report | http://globec.whoi.edu/globec-dir/reports/oc322/oc322.html | |
| Start Date | 1998-04-15 | |
| End Date | 1998-04-27 | |
| Description | broad-scale Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been | |
| | applied to the data reported here. | |

OC336

| Website | https://www.bco-dmo.org/deployment/57459 | |
|-------------|--|--|
| Platform | R/V Oceanus | |
| Report | http://globec.whoi.edu/globec-dir/reports/oc336/oc336cruise-report.html | |
| Start Date | 1999-02-11 | |
| End Date | 1999-02-23 | |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. | |

OC341

| 00341 | | |
|-------------|--|--|
| Website | https://www.bco-dmo.org/deployment/57464 | |
| Platform | R/V Oceanus | |
| Report | http://globec.whoi.edu/globec-dir/reports/oc341/reptoc341.html | |
| Start Date | 1999-04-16 | |
| End Date | 1999-04-27 | |
| | broad-scale | |
| Description | Methods & Sampling GLOBEC Fish Larvae collected by Bongo nets, Standard Haul Factor: numerical factor (multiplier) used to standardize catches to be expressed as number caught per 10m2 of sea surface area. Most haul factors range from 1 to 10. The Standard Haul Factor has not been applied to the data reported here. | |

[table of contents | back to top]

Project Information

U.S. GLOBEC Georges Bank (GB)

Website: http://globec.whoi.edu/globec_program.html

Coverage: Georges Bank, Gulf of Maine, Northwest Atlantic Ocean

The U.S. GLOBEC <u>Georges Bank</u> Program is a large multi- disciplinary multi-year oceanographic effort. The proximate goal is to understand the population dynamics of key species on the Bank - Cod, <u>Haddock</u>, and two species of zooplankton (<u>Calanus finmarchicus</u> and <u>Pseudocalanus</u>) - in terms of their coupling to the physical environment and in terms of their <u>predators and prey</u>. The ultimate goal is to be able to predict changes in the distribution and abundance of these species as a result of changes in their physical and biotic environment as well as to anticipate how their populations might respond to climate change.

The effort is substantial, requiring broad-scale surveys of the entire Bank, and process studies which focus both on the links between the target species and their physical environment, and the determination of fundamental aspects of these species' life history (birth rates, growth rates, death rates, etc).

Equally important are the modelling efforts that are ongoing which seek to provide realistic predictions of the flow field and which utilize the life history information to produce an integrated view of the dynamics of the populations.

The U.S. GLOBEC Georges Bank <u>Executive Committee (EXCO)</u> provides program leadership and effective communication with the funding agencies.

[table of contents | back to top]

Program Information

U.S. GLOBal ocean ECosystems dynamics (U.S. GLOBEC)

Website: http://www.usglobec.org/

Coverage: Global

U.S. GLOBEC (GLOBal ocean ECosystems dynamics) is a research program organized by oceanographers and fisheries scientists to address the question of how global climate change may affect the abundance and production of animals in the sea.

The U.S. GLOBEC Program currently had major research efforts underway in the Georges Bank / Northwest Atlantic Region, and the Northeast Pacific (with components in the California Current and in the Coastal Gulf of Alaska). U.S. GLOBEC was a major contributor to International GLOBEC efforts in the Southern Ocean and Western Antarctic Peninsula (WAP).

[table of contents | back to top]

Funding

| Funding Source | Award |
|--|-----------------|
| National Science Foundation (NSF) | unknown GB NSF |
| National Oceanic and Atmospheric Administration (NOAA) | unknown GB NOAA |

[table of contents | back to top]