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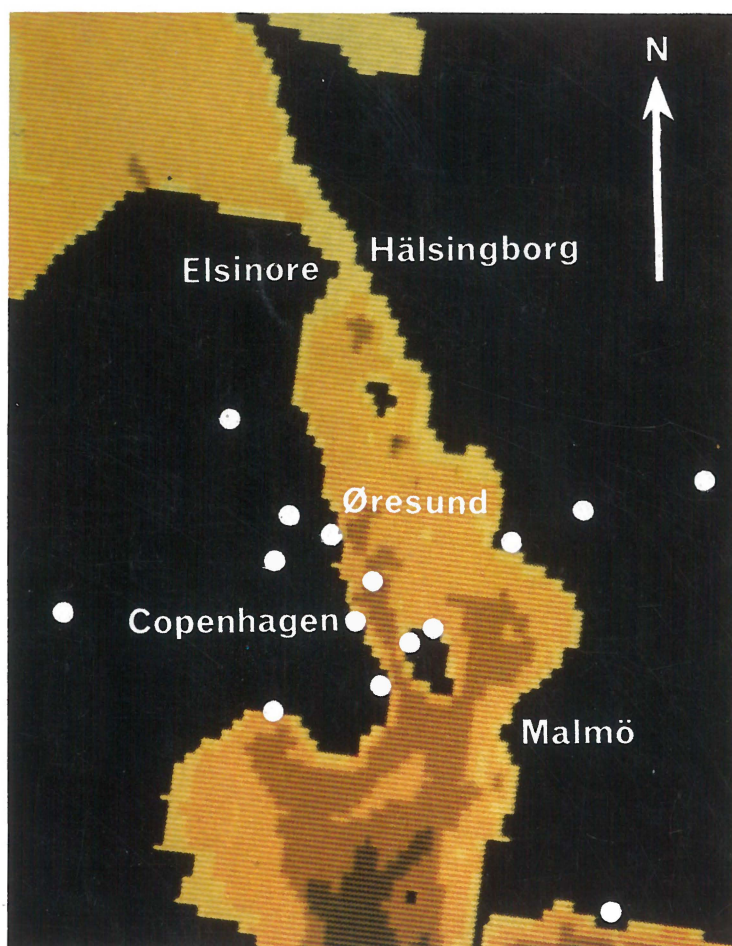
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The Øresund Experiment

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THE ØRESUND EXPERIMENT DATA BANK

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The main objective of the Øresund Experiment was to obtain a comprehensive data set suitable for verifying mesoscale meteorological and dispersion models in a coastal environment. Furthermore, it was a project goal to make these data available for general use. Hence, the establishment of a data bank for the experiment was included in the project. This contribution gives a brief overview of the data bank now established and mentions some of the salient features of the data formatting system. A report describing the data bank in more detail as well as summarizing and illustrating many of the measurements is provided in [1].

The data set of the Øresund Experiment has been compiled on magnetic tape according to the IOC general magnetic tape format (GF3). This format scheme was devised for international exchange of geophysical data, primarily of numerical nature. An introductory guide, as well as the complete technical specification of the system is given in [2]. The GF3 system has the following general characteristics (excerpt from [2]):

1. The format consists of rather simple structures so that it can be used by single scientist and small institutions, as well as large data centers.
2. The format is largely self-documenting and self-describing through the provision of plain language comment capabilities at all levels of the structure and through inclusion of formatting information and character coding information on the tape.

3. The format is capable of being processed automatically by the recipient of the tape.
4. The structures of the format are capable of transmitting complex multidisciplinary data sets, as well as the most simple sets.
5. The format is a magnetic tape format for the exchange of data and is in many cases suitable for archiving of these data.

A major feature of the GF3 format system is the fact that a GF3 tape is self-contained. All the information necessary to interpret and understand the contents of the tape and to retrieve the data, is included on the tape itself. Thus, to process a GF3 tape only the density and character code of the tape need to be known in advance (and the fact that the tape is in GF3 format).

The basic element of GF3 is the GF3 record, corresponding to the fixed-size physical record or block. In the hierarchical structure of GF3 the records are organized into series. One or more series constitute a file and the files are organized into one or several tapes. The table of contents of the Øresund Data Bank on the file level of the tape is shown in table 1. Four types of files are recognized by GF3: the Test File (file ID 001 in table 1), the Tape Header file (002), the Data Files (from 003 through 212) and the Tape Terminator File (480).

The primary purpose of the Test file is to protect the leading portion of the tape from damage.

The Tape Header File contains character coding information and other information pertaining to the tape as a whole, e.g. the originating data centre, the version of GF3 used and tape identification. On the Øresund tape this file also contains

the table of contents of the tape, a complete list of the GF3 codes used on the tape, a list of the conventions of time, position etc. used, references to the format and some general publications on the Øresund Experiment and bibliographical information.

The Data Files contain the experimental data. One Data File generally contains the measurements at a certain site with a specific measuring system or from a specific platform. Each file is constructed using the record types provided by GF3 and it is divided in two parts: a file header part and the data. The header part of the file contains information on the data-collecting institution and when, where and how the data were collected. Reference to a technical report describing details of the measurements, as well as reference to other data files and/or reports relevant to the interpretation of the data in question are also given here. Furthermore, this part of the data file may contain tables summarizing the measurements or tables of derived quantities calculated by the data-collecting institution. For each type of measurement in the file a description of the instrument used, its characteristics and the expected accuracy is always given. Immediately preceding the data series, a FORTRAN format statement to read the data is listed together with a short definition of the data parameters and the dummy values to be expected in the data. The hierarchy of the data file and the capability of reading the format statement means that any data file can be read and the data retrieved by a relatively simple general program. The plain language documentation included in the data files amount to almost 200 pages in total, i.e. 3-4 pages in each data file. The data are stored as integer values in the data records of the file. These are converted to the physical values when reading the data, by scaling factors provided in the file header part. The data are arranged in a tabular format to enhance legibility when printed on paper.

The last file on the tape is the Tape Terminator File indicating whether the data set is complete or continued on another tape.

THE DATA BANK PACKAGE

The Øresund Experiment Data Bank will be available from Risø National Laboratory and consists of the following items:

- a magnetic tape in GF3.2 format containing the documented data set of the Øresund Experiment.
- a magnetic tape with software to process the GF3 tape.
- format and software documentation.
- a data bank report illustrating and summarizing the measurements.
- a general description of the Øresund Experiment.

The data bank is available for 9 different periods, to suit the needs of a variety of possible users, see table 2. The availability of data within each of the 9 periods is indicated in table 1.

The software included in the package consists of three FORTRAN programs; two general programs for summarizing and listing the contents of any GF3 tape, and one specifically directed to the Øresund Data Bank. The general GF3 tape inspection utilities originated in the Marine Information and Advisory Service, U.K. The third program was written at Risø and is intended as a helping hand to users not familiar with the GF3 format. This program lacks the generality of the two former, but is more transparent to the user and can readily be accommodated to suit the needs of the user. The program reads and decodes a complete GF3 file, making the information and data available to the user for further processing.

The data bank report contains information not readily mapped into GF3, e.g. weather maps from each day of the experiment and satellite images from days with tracer experiments. Furthermore, the report presents an overview of the experiment in tables and drawings. An example is shown in fig. 1. The general meteorological conditions are revealed through time-series plots of selected meteorological parameters. Displaced profile plots of sodar wind speeds and radiosonde potential temperatures gives evidence of the structure of the atmospheric boundary layer. Finally, each of the nine tracer experiments is illustrated by a map of the experimental set-up and drawings of the tracer concentration profiles. A brief overview of the conventions applied in compiling the data into GF3 is also given.

REFERENCES:

- [1] Mortensen, N.G. and S.-E. Gryning (1986). The Øresund Experiment - Data Bank Report. Report: NORDFORSK/Øresund-4. Risø National Laboratory, DK-4000 Roskilde, Denmark.
- [2] Intergovernmental Oceanographic Commission. GF3 - The IOC general magnetic tape format for the international exchange of oceanographic data. Manuals and Guides no. 9, Annex 1, Parts 1 (Technical Specification), 2 (Code Tables) and 3 (Introductory Guide).

Table 1. Table of contents of the Øresund Data Bank and availability of data. Asterisks indicate that data are available.

FILE ID	FILE CATEGORY OR TITLE	-- P E R I O D -- (cf. table 2)								
001-009	GENERAL	-----								
001	TEST FILE									
002	TAPE HEADER FILE									
003	MAP OF ØRESUND REGION									
004	TABLE OF SCAN-TIMES									
010-039	MAST/ENERGY BALANCE MEASUREMENTS	1	2	3	4	5	6	7	8	9
019	RISØ SMALL MAST	*	*	*	*	*	*	*	*	*
020	RISØ TOWER	*	*	*	*	*	*	*	*	*
021	HØJBAKKEGÅRD	*	*	*	*	*	*	*	*	*
022	SJÆLSMARK	*	*	*	*	*	*	*	*	*
023	AVEDØRE	*	*	*	*	*	*	*	*	*
024	CHARLOTTENLUND	*	*	*	*	*	*	*	*	*
025	MARGRETHEHOLM	*	*	*	*	*	*	*	*	*
026	SALTHOLM WEST	*	*	*	*	*	*	*	*	*
027	SALTHOLM EAST	*	*	*	*	*	*	*	*	*
028	R/V ARANDA (ØRESUND)	-	-	-	-	-	*	*	*	-
029	BARSEBAECK BEACH 1	*	*	*	*	*	*	*	*	*
030	BARSEBAECK BEACH 2	*	*	*	*	*	*	*	*	*
031	BARSEBAECK BEACH 3	*	*	*	*	*	*	*	*	*
032	BARSEBAECK TOWER	*	*	*	*	*	*	*	*	*
033	MAGLARP	*	*	*	*	*	*	*	*	*
034	FURULUND	*	*	*	*	*	*	*	*	*
040-059	SODAR MEASUREMENTS	1	2	3	4	5	6	7	8	9
040	GLADSAXE	*	*	*	*	*	*	*	*	*
041	MIDDELGRUNDEN	*	*	*	*	*	*	*	*	*
042	KASTRUP	*	*	*	*	*	*	*	*	*
050	BARSEBAECK	*	*	*	*	*	*	*	*	*
051	FURULUND	*	*	*	*	*	*	*	*	*
052	BORLUNDA	-	*	-	*	*	*	*	*	*
060-079	RADIOSONDE MEASUREMENTS	1	2	3	4	5	6	7	8	9
060	BALLERUP: MINI-SONDE	-	-	-	-	-	-	*	*	-
061	JÆGERSBORG: RADIOSONDE	*	*	*	*	*	*	*	*	*
062	ØRESUND: MINI-SONDE	*	-	-	-	*	-	*	-	*
063	ØRESUND: SPRENGER SONDE	-	-	-	-	*	-	*	-	-
070	BORLUNDA: RADIOSONDE	*	*	*	*	*	*	*	*	*
080-099	BALLOON MEASUREMENTS	1	2	3	4	5	6	7	8	9
080	CHARLOTTENLUND: TETHERED BALLOON	-	-	-	-	-	-	-	*	-
090	BARSEBAECK: TETROON FLIGHTS	-	-	-	-	-	-	*	*	-
091	BARSEBAECK: TETHERED BALLOON	-	-	-	*	*	*	*	*	*
092	BARSEBAECK: PILOT BALLOON	-	-	-	-	-	-	*	-	*

Table 1 (continued)

100-119	TURBULENCE MEASUREMENTS	1	2	3	4	5	6	7	8	9
100	GLADSAXE: FAST SCANNING	*	-	*	-	*	-	*	-	*
101	GLADSAXE: MEAN QUANTITIES	*	-	*	-	*	-	*	-	*
110	BARSEBAECK: FAST SCANNING	*	*	*	*	*	*	*	*	*
111	BARSEBAECK: MEAN QUANTITIES	*	*	*	*	*	*	*	*	*
120-139	METEOROLOGICAL OBSERVATIONS (SYNOP)	1	2	3	4	5	6	7	8	9
120	KASTRUP: METAR OBSERVATIONS	*	*	*	*	*	*	*	*	*
121	DENMARK: SYNOPTIC PRESSURE OBS.	*	*	*	*	*	*	*	*	*
130	SWEDEN: SYNOPTIC OBSERVATIONS	*	*	*	*	*	*	*	*	*
140-159	MISCELLANEOUS METEOROLOGY	1	2	3	4	5	6	7	8	9
140	CHARLOTTENLUND INTENSIVE	*	*	*	-	-	-	*	*	-
149	ØRESUND: AIRPLANE MEASUREMENTS	-	-	-	-	*	-	*	-	*
150	BORLUNDA: TPR TEMPERATURE PROFILES	-	-	-	*	*	*	*	*	*
151	BORLUNDA: TPR BRIGHTNESS TEMP.	-	-	-	*	*	*	*	*	*
152	BORLUNDA - GROUND LEVEL OBS.	-	-	-	*	*	*	*	*	*
200-219	TRACER MEASUREMENTS	1	2	3	4	5	6	7	8	9
200	TIME AVERAGED: MEASUREMENTS	*	-	*	-	*	-	*	-	*
201	- : DERIVED QUANTITIES	*	-	*	-	*	-	*	-	*
210	INSTANTANEOUS: VAN	*	-	*	-	*	-	*	-	*
211	- : AIRPLANE	-	-	-	-	*	-	*	-	*
212	- : FISHING BOAT	-	-	-	-	-	-	*	-	-
480-499	GENERAL									
480	END OF TAPE FILE									

Table 2. The data bank periods of table 1.

1	: 15-18 may	4 days	2 tracer experiments
2	: 19-21 may	3 days	
3	: 22 may	1 day	1 tracer experiment
4	: 23-28 may	6 days	
5	: 29-30 may	2 days	2 tracer experiments
6	: 31-03 may/june	4 days	
7	: 04-05 june	2 days	2 tracer experiments
8	: 06-11 june	6 days	
9	: 12-14 june	3 days	2 tracer experiments
15 may - 15 june		31 days	9 tracer experiments

The Øresund Region

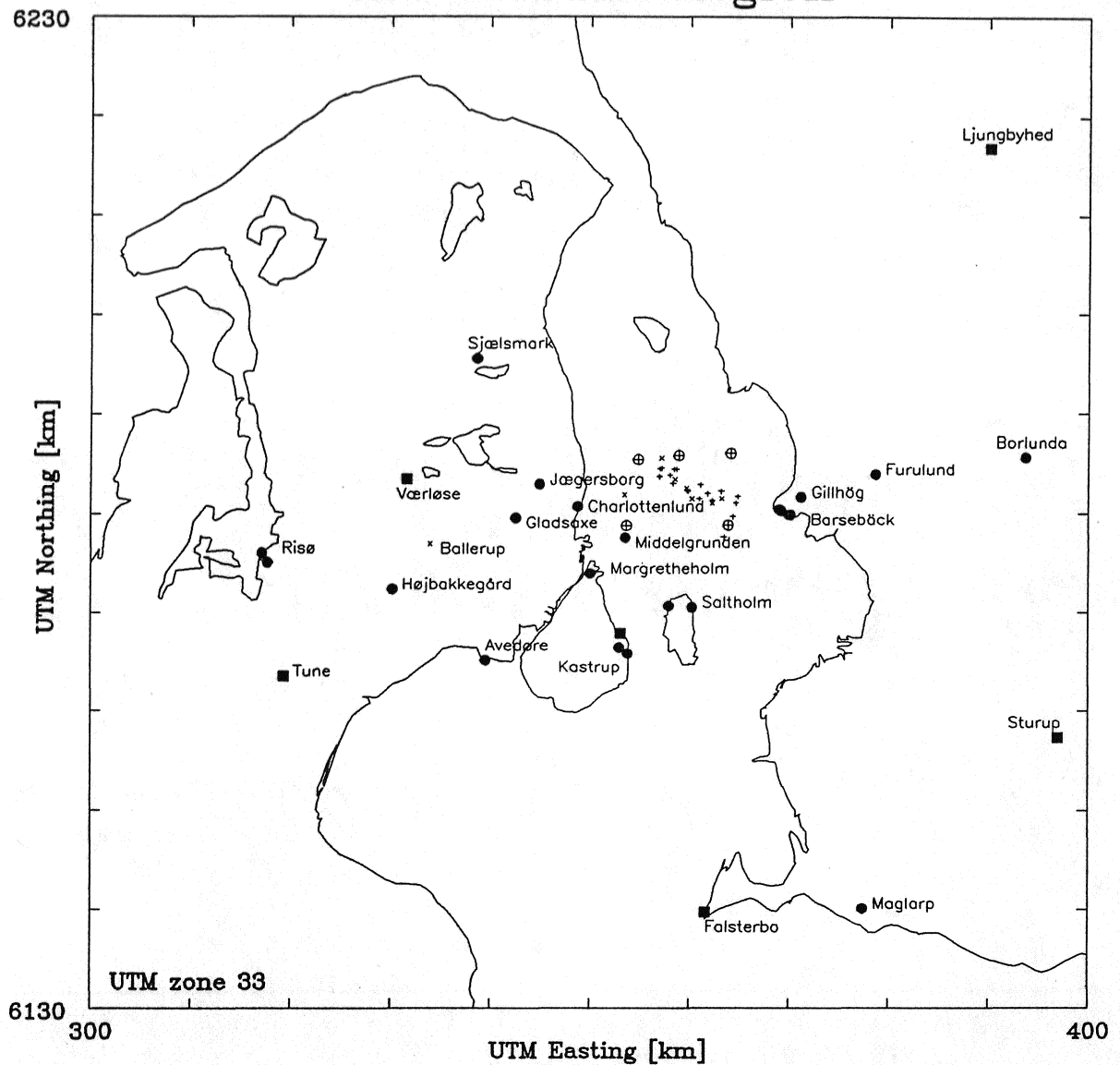


Figure 1. The Øresund Region with the measuring sites of the experiment, cf. table 1. Squares are synoptic stations not mentioned in table 1., circles with crosses are the positions of R/V Aranda. The map, frame and positions are included in the data bank (file ID 003).