AN INTRODUCTION TO THE OCEAN ANALYSIS SOFTWARE PACKAGE

January 22, 2008

The Ocean Analysis Software Package (OASP) is a set of FORTRAN and C programs designed to process and analyze time and space series data particularly oceanographic data. These programs (see INTRO-4) are designed to operate on data files stored in a form referred to as Ocean Format (see INTRO-2). (There is an OASP routine for converting ASCII data files into Ocean Format.

Once the data is in Ocean Format, OASP routines for manipulating and editing the raw data series can be invoked. The edited raw data can be converted into engineering units using various standard and/or user-specified transformations. There are other OASP routines which can then be used to perform spectral, tidal and other specialized analyses on the preprocessed data. Various OASP output and plotting routines are available to produce hardcopy listings or plots of the analysis results.

The documentation for each OASP routines has the following structure:

1 PURPOSE:
   -a general overview of the function the routine performs

2 EXECUTION:
   -a step-by-step listing of the commands, prompts and responses the user encounters when executing the routine

3 OUTPUT:
   -describes the location and form of the output from the routine
   *Most of the OASP routines are in FORTRAN 77 and thus convertible to other hardware with relative ease.
Ocean Format files are composed of a seven-line ASCII header, followed by the binary data.
The structure of a time-series Ocean Format file is as follows:

**HEADER**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FILEXX.EXT</td>
<td>File Name (10 chars)</td>
</tr>
<tr>
<td>MM/DD/YY</td>
<td>Date of file creation</td>
</tr>
<tr>
<td>HH:MM:SS</td>
<td>Time of file creation</td>
</tr>
<tr>
<td>9999999.00000000</td>
<td>Series start time (Julian hours*)</td>
</tr>
<tr>
<td>9999999.00000000</td>
<td>Series end time (Julian hours*)</td>
</tr>
<tr>
<td>999</td>
<td>Number of terms in series</td>
</tr>
<tr>
<td>1.0</td>
<td>Series time increment (Hours)</td>
</tr>
</tbody>
</table>

Data

**SERIES**

**TERMS**

xxx.xx  

**NFILES**  Number of merged files

The structure of a vertical profile Ocean Format file (e.g. CTD data for ) is as follows:

**HEADER**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>FILEXX.EXT</td>
<td>File Name (10 chars)</td>
</tr>
<tr>
<td>MM/DD/YY</td>
<td>Date of file creation</td>
</tr>
<tr>
<td>HH:MM:SS</td>
<td>Time of file creation</td>
</tr>
<tr>
<td>XX.XXXX</td>
<td>Latitude</td>
</tr>
<tr>
<td>XX.XXXX</td>
<td>Longitude</td>
</tr>
<tr>
<td>999</td>
<td>Number of terms in series</td>
</tr>
<tr>
<td>9.999999*05</td>
<td>Start time of &quot;cast&quot; (Julian hours*)</td>
</tr>
</tbody>
</table>

Data

**SERIES**

**TERMS**

xxxxxx  

N FILES  Number of merged files

*Usually Julian hours (see INTRO) are used. However, any consistent time convention can be used.

Data

As above

xxxxxx
OASP DIRECTORY

AIRSEA - Computes fluxes across air/sea interface.

ARCHIV - A PRIME - specific routine for archiving Ocean Format files.

ARITH - Arithmetic operations routine.

CHANGE - Converts digitized data locations into latitude/longitude.

COMMON - Generates a set of common length time series.

CONDEPTH - Produces vertical section from profile data.

CONFIRM - Confirms data archived on ASCII tapes.

CONTIME - Produces depth vs. time contour plots.

CONTOR - Creates general purpose contour plots.

CORREL - Cross-correlation routine

COVAR - Computes cross-covariance matrix.

CTDINFO - Organizes CTD header information.

CTDREAD - Reads CTD data into Ocean Format files.

CTDPRO - Computes derived quantities CTD profile data.

DATES - Conversion of Julian Hours to Gregorian time/date and visa versa.

DYNAM - Computes estimates of terms in the momentum equations from data.

ECHECK - Confirms data archived on EBCDIC tapes.

EDIT - A variety of editing techniques for spurious data.

EIGEN - Computes time and frequency-domain empirical orthogonal functions.

ENUNIT - Converts standard forms of raw data into engineering units.

ERTRIV - Retrieves data from a EBCDIC archive tape.
INTRO

FILTER  - General purpose time (or space) series filtering routine.
FOUCOF  - Computes Fourier coefficients.
GFLOW   - Computes geostrophic flow from CTD data.
GRAFF   - General purpose X-Y plot routine.
HEADER  - Ocean Format header inspection and correction routine.
HISTRO  - Creates histogram plots of data.
HYDRO78 - Computes derived quantities from temperature and conductivity time series.
INTIRP  - Time interpolation routine.
ISO     - Isopycnal depth time series.
JOINOF  - Routine to join series together.
LSTARC  - Lists various characteristics of a data set.
LSTATS  - Computes statistics of a list of data series.
MAKET   - Creates synthetic time series.
MERGE   - Merges and unmerges time series.
MULCOH  - Computes multiple coherences and transfer functions.
NODC    - Creates a data tape in National Oceanographic Data Center format.
OUTPUT  - Outputs Ocean Format series to user-specified devices.
PIECE   - Truncates series.
PLOT CTD - Special plot routine for CTD profile data.
PRPLOT  - Produces line-printer plots.
QUIP    - Quick time series plotting routine.
INTRO

READIN - Converts ASCII data to Ocean Format files.
REGRESS - Computes least squares fits to data.
RETRIV - Retrieves archived data from an ASCII tape.
SCANCHK - Digitizer error-correcting routine.
SEAWATER - Computes derived quantities for a single set of CTD values.
SERCHE - Scans data sets ans saves selected values according to given criteria.
SMOOTH - Log spectral smoothing routine.
SPECTER - Cross-spectral matrix calculation.
STATS - Computes general statistics of a time series.
STKPLT - Multiple time-series plotting routine.
TAPEDIR - Accesses data on tape.
TELLIP - Computes elliptical representation of currents.
TIDADM - Generates complex linear admittances from TIDWTS weights.
TIDHAR - Predicts tides from harmonic constituents.
TIDPOT - Generates tide potential.
TIDRSP - Predicts tides by the response method.
TIDWTS - Computes weights of a tidal response analysis.
TIHARC98 - General harmonic analysis routine.
TIMPLOTGKS - General purpose time series plotting routine.
TRANSPORT - Computes geostrophic flow from moored oceanographic data.
TS - Generates a temperature-salinity-diagrams.
VSTATS - Computes vector statistics and ellipses.
- Organizes geographic information for plotting.
LIST OPTION

The following OASP programs permit the user to list up to 100 file names on which the program will act upon automatically and sequentially. AIRSEA, ARITH, FILTER, FIT, INTIRP, LSTATS, OUTPUT, PIECE

The following is an example of how the list option is implemented in ARITH

1. "DO YOU WISH THE LIST OPTION?"
   "ANSWER Y OR N" - enter Y or N

   If "N" then the program proceeds normally.

2. "DO YOU WISH A COMMON EXTENSION FOR THE OUTPUT FILES?"
   "ANSWER Y OR N"

   2A. If "Y" :
       "ENTER EXTENSION:" - enter an extension (up to 3 characters) to be appended to each new output file automatically.

   2B. If "N", then output file names will have to be entered

   For a single input series,
   3A. "SERIES INPUT NAME:" - enter input filename

   For pairs of input series:
   3B. "SERIES U INPUT NAME:" - enter U series input filename
       "SERIES V INPUT NAME:" - enter V series input filename

   If question 2 answer is "N" and a single output series
   4A. "OUTPUT NAME:" - enter entire output filename

   ...If question 2 answer is "N" and more than one output filenames

   4B. "X OUTPUT NAME:" - enter entire output filename
       "Y OUTPUT NAME:" - enter entire output filename

5. Program loops back to question 3 until $$ indicates list entry is done.

   NOTE: The routine ignores any input filename(s) it can not find and outputs the following error message:
   "ERROR filename NOT FOUND, THIS SET IGNORED."
PRIME OASP LIBRARIES/TABLES

OASP
Gr - diplot
Gr - gks

PNCAR
spclib

SPCLIB - Spectral computations (used by MULCOH)

OTHER LIBRARIES

Some of the programs may require some or all of the following system libraries:

DIPLTV - Diplot plotting library.

IMSLIB77S/IMSLIB77D - IMSL mathematical routines (Single/Double precision).

VSPOO$ - Automatic spooling.

NCAR - NCAR of plotting package library.

VAPPLB - FORTRAN application library.

CCLIB - C application library