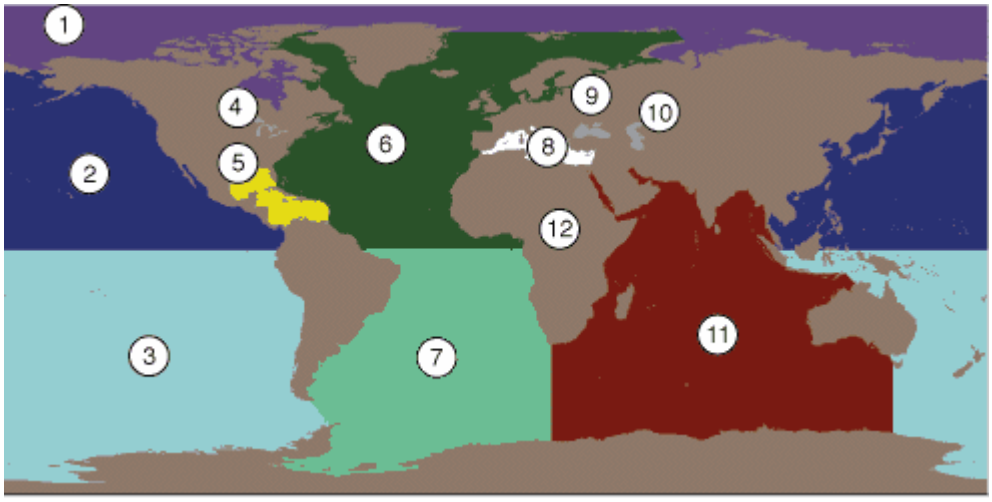
Ancillary Data

The last step in the compilation of the PFMDB is the addition of ancillary data to the matchups (Figure 1, step 7). The quantities described below are new to Version 19 of the PFMDB.

1. Basin codes. To facilitate regional analyses of SST algorithm performance (or to derive regionally optimised algorithm), Version 19 includes a code (Field 191) that assigns a matchup to one of twelve possible locations associated with ocean basins or enclosed seas. The area boundaries are shown in Figure 7. Note that “land” is one of the values that the basin variable may take. Most in situ SST reports on land were eliminated in the quality control stage. Nevertheless, because the land mask used here has a relatively coarse resolution, it is possible for valid data located fairly close to shore to be included in the PFMDB. The values for basin code listed in the matchups are text strings kisted in the table below.

Basin code	Basin string
1	arctic
2	pacific_n
3	pacific_s
4	great_lakes
5	caribbean
6	atlantic_n
7	atlantic_s
8	mediterranean
9	black
10	caspian
11	indian
12	land

Figure 7. Ocean basins and enclosed bodies of water used to locate Pathfinder matchups.



2. Water column depth. The water column depth at each matchup location was extracted from the ETOPO5 database available at NOAA’s National Geophysical Data Center*. This global bathymetry data base has a spatial resolution of 5 minutes. We note that there are known problems with the ETOPO5 data for some regions. These values were included to

facilitate separation of coastal observations (where SST retrievals potentially may be affected by land-influenced atmospheric conditions) from open-ocean regimes, where maritime atmospheres prevail.

3. Reynolds/NCEP Optimally Interpolated SSTs (OISST). The Optimum Interpolation SST* analysis is produced weekly on a one-degree grid by Dr. Richard Reynolds of the National Center for Environmental Prediction (NCEP). The analysis uses in situ and satellite SSTs plus SSTs simulated by sea-ice cover. Before the analysis is computed, the satellite data are adjusted for biases. A description of the OI analysis can be found in Reynolds and Smith (1994). As recommended by the producers of the data set, we used a 1:2:1 filter in time to reduce noise in the weekly fields. That is, the value at a grid point at week t was a weighted average of the values at week t - 1, week t, and week t + 1, and the weights used were 1, 2, and 1, respectively. To add the OISST value to a matchup, first we defined the filtered OISST weekly field from which data were to be extracted; then we extracted the OISST for the grid point closest to the matchup location (i.e., no spatial or temporal interpolation was used).

4. SSM/I-derived columnar water vapor values. We appended to some of the matchups estimates of integrated atmospheric water vapor (CWV, or columnar water vapor) derived from the Special Sensor Microwave/Imager (SSM/I), a microwave radiometer onboard spacecraft of the Defense Meteorological Satellite Program (DMSP)* series (Hollinger et al., 1990). The CWV values were extracted from a set of geophysical files produced by Wentz (1989, 1992a) and distributed by NASA's Jet Propulsion Laboratory Physical Oceanography Distributed Active Archive Center (JPL-PODAAC). The CWV retrieval algorithm, described in Wentz (1992b) has a stated accuracy of 0.3 g cm-2 or better, even in the presence of light rain. The CWV values included in Version 19 of the matchups encompass the period July 1987–December 1992; subsequent versions will include more recent SSM/I data, which have recently been released by F. Wentz. Data for 1987–1991 are from the F-8 spacecraft; 1992 data are from the F10 satellite. We extracted CWV from global daily fields built from each SSM/I daily file. The original SSM/I pixels (approximately 25 km in size) were combined into daily "super observations" files on a 0.5° grid. The CWV value at a matchup location was derived by interpolating in space from the four surrounding grid points in the corresponding daily CWV file.

For 1995 and 1996 matchups, data from the Pathfinder version of the SSM/I water vapor algorithm were used. The Pathfinder version ot SSMI-derived columnar water vapor is available by ftp from the WWW site http://www.ssmi.com*. Water vapor values were estimated with a new algorithm [Wentz, 1997] with a quoted error of 1mm. The daily 0.25 degree gridded morning and evening data were averaged and converted to a 0.5 degree grid using GMT's blockmedian filtering technique. The CWV value at a matchup location was derived by interpolating in space from the four surrounding grid points in the corresponding daily CWV file as previously described.

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