Definitions used by the DBCP for evaluation purposes.

(definitions as of 16/11/2005)

Remark: The purpose of such definitions is not to define any requirement not to re-define things already defined elsewhere. We are using here requirements expressed by the WWW and the OOPC. The goal is to translate such requirements in what the DBCP could reasonably achieve taking other sources of observation (e.g. remote sensing, ships, etc.) into account (e.g. if WWW says we have to achieve 500*500 km horizontal resolution, how many drifting buoys should we target for the Southern Ocean?). Figures are given as estimates only. These definitions are for DBCP use only.

Definitions:

Time resolution: Average difference in hours between two useful observations during an instrument *operational life-time*.

Acceptable time resolution: This is the maximum *time resolution* of the instrument for it to be considered as still having a positive impact in average for the considered application assuming that other requirements (*horizontal res., vertical res., accuracy, delays*) are met.

Useful observation: An observation which achieves *acceptable accuracy*, *acceptable delay*, and *acceptable vertical resolution* for the considered variable and application provided that *useful day of observation* is not already achieved for that observation and the considered day.

Useful day of observation: An instrument is considered as providing a *day of observation* if sufficient number of *useful observations* are received to achieve *acceptable time resolution* during that day for the considered variable and application.

Early failure/infant failure: We consider an instrument failed prematurely when it was deployed at sea and ceased providing *useful days of observation* immediately or relatively quickly after deployment. Maximum time period in days for a failure to be considered as an *early failure* is indicated for each sensor or component of the instrument. If the instrument fails after that maximum period, the failure is not considered as an early failure.

Required variables: Minimum number of variables to be transmitted during the buoy operational life-time for the buoy as a whole to be still considered as operational for the considered application (e.g. for meteorological purposes, one would consider that location and air pressure are required).

Operational life-time: Total period in days during which the instrument provided *useful days of observation*

Buoy operational life-time: Total period in days during which the buoy provided *useful days of observation* for all *required variables*.

Useful life-time: Minimal life-time of the instrument for it to be considered as cost-effective in the considered observational programme for the considered application assuming that other requirements (*horizontal res., vertical res., time res., accuracy, delays*) are met in average during the instrument operational life-time.

Buoy useful life-time: Minimal life-time of the buoy for it to be considered as cost-effective in the considered observational programme for the considered application assuming other requirements (*horizontal res., vertical res., time res., accuracy, delays*) are met in average during the instrument operational life-time and that all *required variables* are available during that life-time.

Delay (of delivery): Difference in minutes between observation time and the time the observation is actually being used by the considered application.

Acceptable delay: Maximum *delay* of delivery of the data for it to be actually used and still having a positive impact for the considered application assuming that other requirements (*horizontal res., vertical res., time res., accuracy*) are met.

Accuracy: Variability of the instrument with regard to the actual field being measured, here expressed as a RMS value.

Acceptable accuracy: Maximum *accuracy* of the instrument for it to be considered as still having a positive impact in average for the considered application assuming that other requirements (*horizontal res., vertical res., time res., delays*) are met.

Horizontal resolution: When considering a network of instruments, *horizontal resolution* for that network is defined as the total area of the observed area divided by the number of instruments which report *useful day of observation* during a day (or for a considered period, use number of instruments = total number of *useful days of observation* for each buoy divided by the number of days in the considered period). Expressed in km^2.

Acceptable horizontal resolution: This is the maximum *horizontal resolution* of the network for it to be considered as still having a positive impact in average for the considered application assuming that other requirements (*vertical res., time res., accuracy*) are met.

Vertical resolution: In case an instrument makes measurements at different depths in a water column, *vertical resolution* is defined as the total height in meters of the water column divided by the number of consistent measurements distributed in average in a single observation (e.g. if a 500m long string of instruments is equipped with 10 water temperature sensors, T, and 5 salinity sensors, S, vertical resolution for T will be 50m while vertical resolution for S will be 100m).

Acceptable vertical resolution: : This is the maximum *vertical resolution* of the network for it to be considered as still having a positive impact in average for the considered application assuming that other requirements (*horizontal res., time res., accuracy*) are met.

Data availability: Percentage of *useful observations* with regard to the maximum theoretical number of useful observations (to reach an observation day) which can be expected from the buoy for the considered application.

Ending causes: Possible causes for a buoy to cease functioning normally:

- **Accident:** Failures caused by reasons outside the buoy's control, or which the buoy was not designed to withstand, e. g. the parachute failing to open during air deployment due to technical failure of the parachute, or the buoy is damaged due to poor stowage on a ship prior to deployment, etc.
- **Ran Ashore**: The buoy reaches the shoreline and is washed a shore.
- **Bad-data**: The buoy continually transmits bad data (stating precisely the sensor failed, i.e barometer or SST one or…)
- **Battery-failure**: The battery has failed prematurely or is out of order.
- **Faded**: The buoy ends its expected operational period due to battery exhaustion (usually after approx one year of good working for SVP-B drifters).
- **Failed**: The buoy ends its operational period prematurely due to technical failure (other than battery failure).
- **Ice-bound**: The buoy gives very low SST data (negative temperatures), then ceases to emit or the last position is on sea ice maps.
- **Picked up**: The buoy is retrieved from the sea e.g. by fisherman

- **Recovered**: The buoy is intentionally recovered from the sea, e.g. for buoy testing.
- **Unknown**: The buoy ceases to emit data for unknown reasons.
- **Vandalized**: The buoy is damaged intentionally, by persons unknown (*for moored buoys).

Definitions of ocean area: (this list is not exhaustive, and new area might be added as needed)

Attention: These are not formal definitions of Oceans and Seas. These areas are for DBCP use only.

Area	Definition	Approx. total area (km^2)
DBA	Atlantic Ocean between Arctic Circle and 55S and for southern latitudes between 65W (Drake passage) and 20E (Cape of Good Hope). Atlantic area includes Norwegian Sea, Labrador Sea, North Sea, and excludes Gulf of Mexico, Caribbean Sea, Hudson Bay, Baffin Bay, Mediterranean Sea, Baltic Sea.	81 650 000
DBNA	DBA North of Tropic of Cancer	23 882 000
DBSA	DBA South of Tropic of Capricorn	28 437 000
DBTA	DBA between Tropic of Cancer and Tropic of Capricorn	29 331 000
DBLAB	50N-Arctic Circle, 65W-45W	523 762
DBNORW	61N-75N, 9W-20E	1 522 000
DBP	Pacific Ocean between Arctic circle and 55S, and for area south of 20S: between 145E (Tasmania) and 65W (Drake passage). Pacific area includes Bering Sea, Philippine Sea, Coral Sea, Tasman Sea, Solomon Sea, and excludes South China Sea, Sea of Japan, Yellow Sea, East China Sea, Sea of Okhotzk, Celebes Sea, Banada Sea, Arafura Sea	154 241 000
DBNP	DBP North of Tropic of Cancer	32 636 000
DBSP	DBP South Tropic of Capricorn	41 287 000
DBTP	DBP between Tropic of Cancer and Tropic of Capricorn	80 318 000
DBI	Indian Ocean North of 55S and between 20E and 120E. Indian area includes Bay of Bengal, Arabian Sea, Mozambique Channel, and excludes Strait of Malacca, South China Sea, Java Sea, Timor Sea	60 483 000
DBNI	DBI North of the Equator	11 889 000
DBSI	DBI South of the Equator	48 594 000
DBTI	DBI between Tropic of Cancer and Tropic of Capricorn	32 273 000
DBARAB	DBI North of 7N, 50E-77E	4 253 000
DBBENG	DBI North of 7N, 77E-99E	2 581 000
DBS	40S to Antarctic Circle	68 736 000
DBM	Mediterranean Sea, including Tyrrhenian Sea, Aegea Sea, Sea of Crete, excluding Adriatic Sea, Black Sea	2 415 000
DBARC	Arctic Ocean North of Arcitc Circle, including Norwegian Sea, Barents Sea, Kara Sea, Laptev Sea, East Siberian Sea, Greenland Sea, Beaufort Sea; ChukChi Sea, excluding Baffin Bay.	11 760 000
DBANT	Ocean area South of 55S, including Weddell Sea, Scotia Sea, Ross Sea.	34 042 000
DBTAS	Ocean area between 50S and 30S and between 145E and 175E, between 145E and 170E south of New Zealand.	4 544 000

<u>Figure 1</u>: Map of defined ocean areas:

Remark: DBA=DBNA+DBTA+DBSA; DBP=DBNP+DBTP+DBSP; however, DBI=DBNI+DBSI and DBTI overlaps with DBNI and DBSI. Similarly, DBS overlaps with DBANT, DBP, DBSP, DBI, DBSI, DBA, and DBSA.

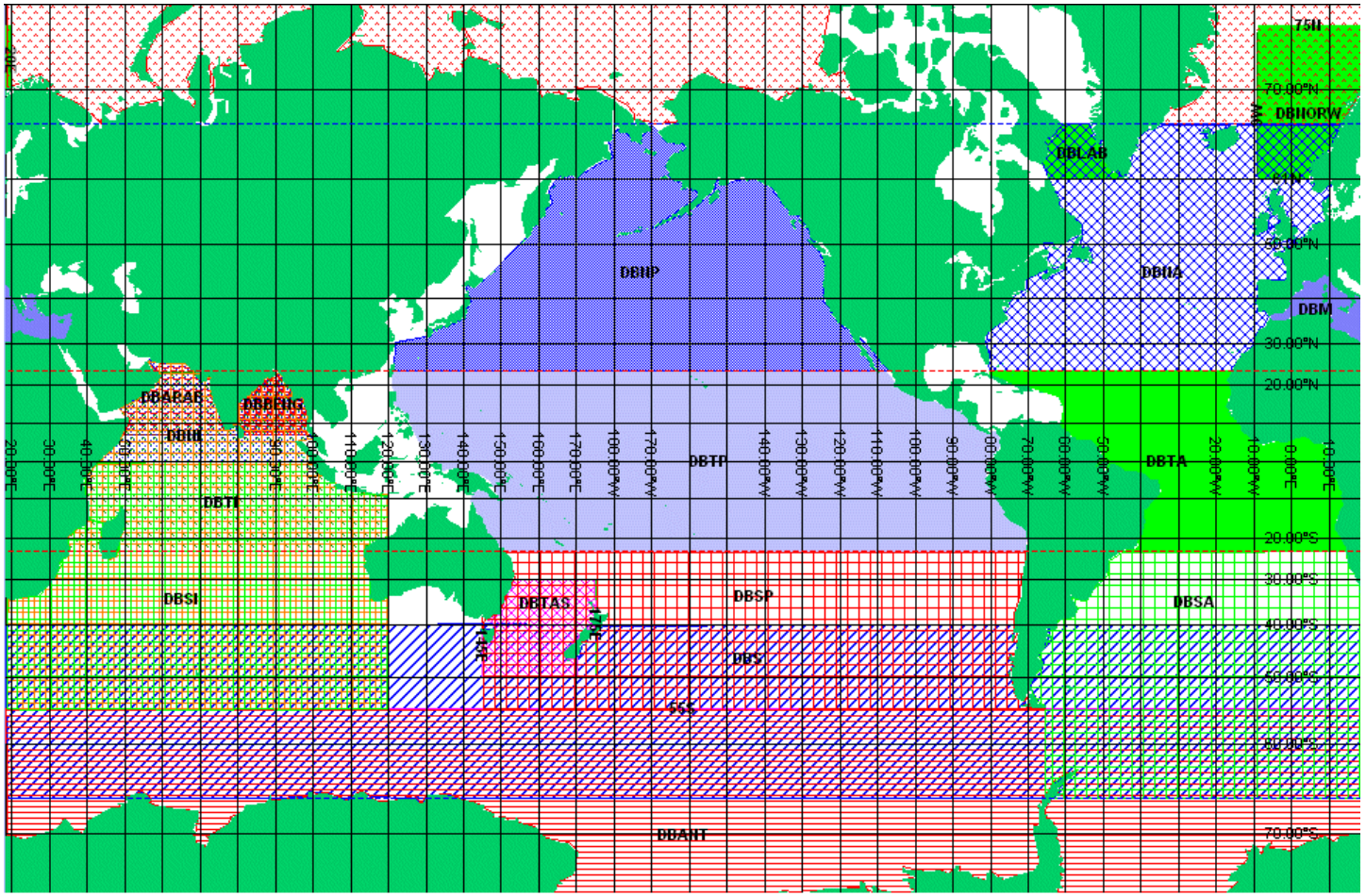

Table 1: Operational meteorology (according to WWW requirements taking other types of instruments both remote and *in situ* into account):

	Early failure (days)	Useful life-time (days)	Acceptable delay	Acceptable accuracy (RMS)	Acceptable horizontal res. (km^2)	Acceptable vertical res. (m)	Acceptable time res. (hour)
Buoy	20	365	3h	/	500*500	/	3h
Transmitter	20	365	3h	/	/	/	3h
Battery (V)	20	365	24h	1V	Every unit to provide voltage information	/	24h
Location (m)	20	365	24h	10000m	500*500	/	24h
Air Pressure (hPa)	20	365	3h	1hPa	500*500	/	3h
Air Pressure Tend. (hPa/3h)	20	365	3h	0.2hPa/3h	500*500	/	3h
SST (C)	20	365	24h	1C	500*500	/	24h
SSS (psu)	/	/	/	/	/	/	/
Air Temp. (C)	20	365	3h	1C	500*500	/	3h
Wind speed (m/s)	20	365	3h	1m/s	500*500	/	3h
Wind Direction (Degrees)	20	365	3h	10 Degrees	500*500	/	3h
Rel. Humidity (%)	20	365	3h	5%	500*500	/	3h
Sub. Surface T (C)	/	/	/	/	/	/	/
Sub. Surface S (psu)	/	/	/	/	/	/	/
Drogue attached (Boolean)	/	/	/	/	/	/	/
Submergence (% time)	/	/	/	/	/	/	/

Table 2: Oceanography (according to OOPC requirements taking other types of instruments both remote and *in situ* into account):

	Early failure (days)	Useful life-time (days)	Acceptable delay	Acceptable accuracy (RMS)	Acceptable horizontal res. (km^2)	Acceptable vertical res. (m)	Acceptable time res. (hour)
Buoy	20	365	24h	/		/	24h
Transmitter	20	365	24h	/	/	/	24h
Battery (V)	20	365	24h	1V	Every unit to provide voltage information	/	24h
Location (m)	20	365	24h	300m		/	24h
Air Pressure (hPa)	20	365	24h	1hPa		/	24h
Air Pressure Tend. (hPa/3h)	/	/	/	/	/	/	/
SST (C)	20	365	24h	0.01C		/	24h
SSS (psu)	20	365	24h	0.01psu		/	24h
Air Temp. (C)	20	365	24h	1C		/	24h
Wind speed (m/s)	20	365	24h	2m/s		/	24h
Wind Direction (Degrees)	20	365	24h	10 degrees		/	24h
Rel. Humidity (%)	20	365	24h	5%		/	24h
Sub. Surface T (C)	20	365	24h	0.001C			24h
Sub. Surface S (psu)	20	365	24h	0.001 psu			24h
Drogue attached (Boolean)	20	365	24h	/		/	24h
Submergence (% time)	20	365	24h	20%		/	24h