Discussion points on the synthesis of surface fCO2 data (1st technical meeting of the Surface Ocean CO2 Atlas Project)

Progress meeting 1 on 2 December 2007 in Delmenhorst (Germany):
Present Chris Sabine, Dorothee Bakker, Arne Körtzinger (IOCCP), Benjamin Pfeil (CARBOOCEAN data manager), Are Olsen (global).

Progress meeting 2 on Wednesday 5 December 2007 in Bremen (Germany):
Present Dorothee Bakker, Arne Körtzinger (IOCCP), Benjamin Pfeil (CARBOOCEAN data manager), Are Olsen (global), Alex Kozyr (CDIAC), Ute Schuster (Atlantic), Nathalie Lefèvre (new co-chair Atlantic), Nicolas Metzl (SIC), Alberto Borges (coastal seas), Andrew Watson (part of meeting), Rik Wanninkhof, Denis Pierrot, Bob Key.

Nathalie Lefèvre agrees to co-chair the Atlantic group which includes the Arctic Ocean, the North and South Atlantic Ocean.

Synthesis of surface fCO2 data is an international effort using publicly available data.

I On the 1st level QC data set:
- Cut-off for data included in this 1st version data set on 31/12/2007. Freeze set of 1st level QC data, until 2nd level QC has been completed.
- Technical issues on the 1st level QC data set by Taro and Ray have been resolved.
- 1st level QC is not a full data QC. Only outlyers in salinity and atmospheric pressure have been removed.
- Parameters in the 1st level QC data set: all the measured CO2 parameters in water and air, equilibrator temperature, sea surface temperature, atmospheric pressure, as well as salinity from the World Ocean Atlas and atmospheric pressure from NCEP reanalysis, as well as fCO2 calculated in a consistent way from other CO2 parameters.
- Data will be co-located with bathymetry, especially useful for coastal regions.
- Naming of cruises with EXPO codes (country, ship, year, month, date of sailing).
- The data will be archived at CDIAC and will be made accessible to the data PIs and the regional groups for 2nd level QC.
- The data will be put onto a Live Access Server by the PMEL group before the spring meeting. The LAS will catch problems in the data. The LAS will be live during the meeting.
- Advise all data PIs of data calculation routines and a description of the methods in January 2008 with a month for comments. Distribution via an email from IOCCP, link on IOCCP website and an announcement in the IOCCP Newsletter.
- Ask all PIs if they agree that their data are included (Wanninkhof).
- Encourage the PIs to update the metadata (eg. publications).
- Any further issues?

II Suggestions on the 2nd level QC.
- Regional groups have been established at the Paris meeting. The groups will lead the 2nd level QC and the science based on the data synthesis.
- Need for consistent 2nd level QC
- How to do this in practical terms?
- Assessment of uncertainty per cruise (Sabine).

- Get the data to a certain level of certainty (Körtzinger).
- Add flags to the data sets. Design a formal table for all flags, such that flags can be assigned in a consistent and transparent manner (Watson). Flags could be based on the accuracy of the analyser, the number of standards etc.
- Crossover concept tricky.
- How critical should one be?
- Identify unrealistic values
- Document everything!
- Use atmospheric xCO_2 for QC
- If regions are identified, use at least $10°$ overlaps (Key)
- 2nd level QC ready by September 2008

III Meeting of the group leaders on approaches for 2nd level QC in May-June 2008:
- Main aim: Discuss approaches for 2nd level QC and
- Other topic: Identify approaches for gridding/ interpolation? LAS may help.
- Other topic: Identify science issues?
- Participants: Are Olsen, Benjamin Pfeil (global group), regional group leaders, Alex Kozyr (CDIAC), Maria Hood (IOCCP), Dorothee Bakker, Arne Körtzinger, Chris Sabine (IOCCP SSG), Rik Wanninkhof, Taro Takahashi, Bob Key (international advisor)
- Preference for a small meeting at a central location (Paris?) possibly with a video link to remote sites.

Action points:
1) Circulate report of the Delmenhorst and Bremen meetings among participants. Ask absent group leaders for input (Maria Hood, Dorothee Bakker) (December 2008).

2) Contact PIs via IOCCP (January 2008) (Maria Hood, Dorothee Bakker, Are Olsen, Benjamin Pfeil).
Make the items below available to data PIs (Benjamin Pfeil, Are Olsen):
- Draft technical document with description of methods of 1st level QC and calculation of surface water fCO_2,
- Matlab routines for 1st level QC and calculation of surface water fCO_2,
- Original surface CO_2 cruise data files,
- Metadata,
- List of cruises with EXPOcodes and original cruise names.
Ask data PIs within a month:
- To comment on the draft technical document and the Matlab routines for 1st level QC and calculation of fCO_2.
- To contact Benjamin Pfeil, if their public data should NOT be included in the data synthesis.
- To check whether the data base has the final version of their data.
- To check and update the metadata, eg. publications, information on calibration, information on ice cover.

3) Put 1st level QC data on to Live Access Server by March 2008 (Chris Sabine).

4) Make 1st level QC data set available to the group leaders in March 2008 (Benjamin Pfeil, Are Olsen), if possible via the Live Access Server.

5) Organize a meeting for the group leaders by June 2008 (Maria Hood, Dorothee Bakker).

7) 2nd level data QC ready by September 2008. (Is this realistic?)

8) Plan a scientific meeting in 1-2 years for all data PIs.
- Eg. Discussion of interpolation methods. LAS can assist in making a gridded product at a 1° by 1° resolution with finer resolution in coastal regions.

9) Prepare scientific papers for the global CO2 meeting in summer 2009 (Jena).