RECCAP

REGIONAL CARBON CYCLE ASSESSMENT AND PROCESSES
Scope

• To establish the mean carbon balance of large regions of the globe at the scale of continents and large ocean basins, including their component fluxes.

• To do it by using and comparing bottom-up estimates with the results of regional top-down atmospheric inversions, and thereby test the compatibility of regional bottom-up estimates with global atmospheric constraints.

• To evaluate the regional ‘hot-spots’ of interannual variability and possibly the trends and underlying processes over the past decades by combining available long-term observations.

• Rely on existing analysis, regional programmes (e.g. NACP) and global modeling studies (e.g. TRANSCOM)
Products

• Synthesis book (or special issue)

• High-level synthesis paper reporting key results (e.g., Science)

• Summary for Policy Makers

• Database (updatable in the future) of C fluxes from regional and global estimates. Free access data policy.
Global Assessments (Chapters)

Ch-G1  Fossil fuel emissions
Ch-G2  Land use change emissions
Ch-G3  Global atmospheric budget
Ch-T1  Global land budget
Ch-O1  Global ocean climatologies
Ch-O2  Global ocean storage

RECCAP (2008-2010)
Land Regions and Oceans Assessments
(Chapters)

**Land**
- **Ch-L1** Africa
- **Ch-L2** Australia
- **Ch-L3** China
- **Ch-L4** Europe
- **Ch-L5** N. America
- **Ch-L6** Russia
- **Ch-L7** S. America
- **Ch-L8** South and S.E. Asia

**Oceans**
- **Ch-O2** Pacific
- **Ch-O3** Atlantic and Arctic
- **Ch-O4** Southern Ocean
- **Ch-O5** Indian

**Rivers and Coastal Zones**
- **Ch-O6** Coastal Ocean
- **Ch-G3** Rivers and lateral fluxes
Global Synthesis Assessments (Chapters)

- **Ch-S1** Comparison of top & bottom up
- **Ch-S2** IAV at regional scale
- **Ch-S3** Attribution to regional processes
- **Ch-S4** Past and future trends in regional C budgets
- **Ch-S5** Final recommendations

RECCAP (2008-2010)
RECCAP target period

Variable but centered around:

• Mean Budgets : 1990-2008
• Trend analyses: 1958-2008
Components of Regional Synthesis

- Regional cuts from global model outputs*
- Regional cuts from global datasets
- Regional model outputs
- Regional datasets

*Centrally organized and provided to regional synthesis groups
## Regional Cuts from Global Model Outputs

<table>
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<th>Region</th>
<th>Coordinator</th>
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<td>Niki Grubber</td>
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<td>Ocean biogeochemical models</td>
<td>Corinne Lequere</td>
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<td>Atmospheric inversions</td>
<td>Kevin Gurney</td>
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<td>Stephen Stitch + NACP</td>
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Air-sea flux estimates:

**Basic data**: sea-air CO$_2$ flux at monthly resolution over the original grid of estimate. Units of mol m$^{-2}$ y$^{-1}$.

**Additional data**: grid, pCO$_2$, SST, wind speed, data statistics (number of data per grid point, variance etc), atmospheric pCO$_2$.

**Metadata**: pCO$_2$ measurement technique, gas exchange model, method to interpolate data.

Ocean interior carbon changes:

**Basic data**: Decadal changes in dissolved inorganic carbon along ship cruise tracks in all oceans.
RECCAP Regions

Ocean Regions

Terrestrial Regions (to be simplified)
Timetable

**August 2007** Initial discussions

**April 2008** “Sign-in” on chapters scope; regional programs are contacted and will provide feedback including possible participants and lead authors.

**Jan-Sept 2009** Consultation period

**Sept. 2009** Consultation session at the ICDC8 in Jena (here)

**Sept. 2009** Invitations to lead authors (two for chapter: modeler and observationalists)

**Nov-Dec 2009** Global Modeling Outputs available
**Timetable**

**June 2010:** Regional groups deliver chapter drafts

**July-Aug 2010:** Internal review of the chapters & model results output is collected.

**October 2010:** Hold the meeting over 4 days; get revised MS from internal review; draft of the Overall Synthesis chapters

**July 2010:** Estimated 12 months processing; reviewing and finishing the ‘global synthesis’ chapters, checking the consistency between chapters (units, definitions ...); provide summary tables with fluxes in Annex
Scientific Steering Committee

- Pep Canadell, *Coordination* (Australia)
- Chris Field (USA)
- Niki Gruber (Switzerland)
- Kevin Gurney (USA)
- Corinne Le Quere (UK)
- Mike Raupach (Australia)
- Chris Sabine (USA)
- Ming Xu (China)
- Philippe Ciais, *Chair* (France)
Endorsement

• COoordination action Carbon Observation System (COCOS), Europe
• Quantifying and Understanding the Earth System (QUEST), UK
• Carbon Cycle Interagency Working Group (CCIWG), USA
• International Ocean Carbon Coordination (IOCC)
• Chinese Science Academy (CAS), China
• CSIRO Marine and Atmospheric Research, Australia
• National Institute for Environmental Studies (NIES), Japan
• Long-Term Biosphere-Atmosphere Experiment (LBA), Brazil
• Carbo-Africa, CarboOcean
• Other contributions welcome!
Proposed Lead Authors

Lead authors (the first two) have been proposed through a community consultation process over the last 14 months.

Lead authors decide their teams but the community consultation has also suggested additional co-authors for consideration by the lead authors.

Lead authors will be invited after the ICDC8 consultation event.
• Ch-G1. Fossil fuel emissions (global). Gregg Marland, Mike Raupach, Kevin Gurney, et al.

• Ch-G2. Land use change emissions (global). Skee Hougton, Ruth DeFries et al., Annette Freibauer, Jim Randerson, Guido van der Werf, Jim Randerson, et al.

• Ch-G3. Global atmospheric budget (global scale analysis). Kevin Gurney, Rachel Law, Andy Jacobson, Christian Rödenbeck, and TransCom teams
Land Chapters

- **Ch-L1. Africa.** Riccardo Valentini (ask to organize), Niall Hanaan, Christopher A. Williams, Dario Papale, Markus Reichstein et al.

- **Ch-L2. Australia.** Mike Raupach, Yingping Wang, Gary Richards, et al.

- **Ch-L3. China.** Ming Xu, Shilong Piao, Shaoqiang Wang, Jingyun Fang, Yao Huang, Mei Huang, Guangsheng Zhou et al.

- **Ch-L4. Europe.** Philippe Ciais (coordinator), Sebastian Luyssaert (U. Antwerp), Detlef Schulze (MPI), Markus Reichstein (MPI-Jena), Dario Papale (U. Tuscia), Alessandro Cescatti (JRC), Nicols Vuichard (LSCE), Martin Wattenbach (UABDN), Gert-Jan Nabuurs (EFI), Martin Heiman (MPI) et al.
Land Chapters

• Ch-L5. **North America.** Mac Post (coordinator), David McGuire, Scott Denning, Andrew Jacobson, Ning Zeng, Steve Pacala, Chris Field et al.

• Ch-L6. **Russia.** Han Dolman (coordinator), Christian Wirth (forests), Anatoly Shvidenko (forests), Usoltsev, David Archard or Danilo Mollicone, Lapshina (forest bogs), Peter Kuhry (tundra), Hubberto, Lucca Belelli (steppes), et al.

• Ch-L7. **South America.** Jean Ometto (coordinator), Emanuel Gloor, Yadvinder Malhi (eddy fluxes, forest inventories), Scott Denning (atmospheric inverse modeling), Simon Lewis (forest inventories), Esteban Jobbagy

• Ch-L8. **South and Southeast Asia.** Pep Canadell (coordinator) Yoshi Yamagata, Ito, Rizaldi Boer, Shaoling Piao, Guido van Werf, et al.
Global Ocean Chapters

• Ch-O1  **Global ocean climatologies.** Chris Sabine, Taro Takahashi, Rik Wanninkhof.

• Ch-O2  **Global ocean carbon storage.** Toste Tanhua (CarboOcean, CARINA etc.), Are Olsen et al. (SOCAT) et al., Robert M. Key (Princeton, GLODAP data set), Reiner Schlitzer (AWI, Bremerhaven) and Joos/Gerber (Univ. Bern) for ocean inversions and data assimilation
Ocean Chapters

- Ch-O2. Pacific. Rck Feely, McKinley et al.
- Ch-O3. Atlantic and Arctic. Schuster, Doug Wallace, Andy Watson, Leif Anderson/Sara Jutterström (Gothenburg), Are Olsen (Bergen), Stefanie Dutkiewicz (MIT), Mick Follows (MIT) et al.
- Ch-O5. Indian. Nicolas Metzl, Sharma, Claire Lo Monaco
Synthesis Chapters

• Ch-S1. Comparison of atmospheric & bottom up fluxes (mean decadal). Wolfgang Knorr, Ning Zeng, Markus Schulz, et al.

• Ch-S2. Inter-annual variability at regional scale. Rachel Law (proposed), Corinne Le Quere, Kevin Gurney, Guido van Werf, Karen Assmann (Bergen, as for Atlantic) et al.

• Ch-S3. Attribution to regional processes over the globe and future dynamics: Niki Gruber, Pep Canadell, et al.


• Ch-S4. Final recommendations (RECCAP committee)