



CONNECTING GLOBAL AND REGIONAL CARBON BUDGETS TO SUPPORT POLICY-MAKING

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There is an increasing demand for scientific support on climate-related decisions, in particular for providing societies and policy-makers with reliable and up-to-date information about atmospheric GHG. The Global Carbon Project now reports annually on the evolution of CO₂ sources and sinks, their uncertainties and the resulting Global Carbon Budget, in phase with the United Nations Framework Convention on Climate Change (UNFCCC) annual Conference of the Parties (COP). Global stocktaking as defined by the Paris Agreement further requires information about regional GHG budgets that should be consistent with the global budgets and regularly updated.

The “REgional Carbon Cycle Assessment and Processes” (RECCAP-1) was promoted by the GCP and carried out by the international carbon cycle research community between 2011 and 2014. RECCAP-1 delivered an unprecedented synthesis of the mean carbon balance and change over the period 1990–2009 for all subcontinents and ocean basins. The global coverage provided, for the first time, opportunities to link regional budgets with the global carbon budget, and to investigate trends in global and regional fluxes. Still, in the latest global carbon budget (LeQuéré et al., 2018, *ESSD*) top-down and bottom-up estimates show important discrepancies over different latitudinal bands and a non-negligible fraction of the global carbon budget variability remains to be captured by land and ocean models. This underscores the need for regional studies to better constrain key processes/regions in the global C-cycle.

Since RECCAP-1, a wide constellation of satellite-based surface monitoring products and of data-driven products of ocean and land CO₂ fluxes became available. This opens the opportunity for novel approaches combining in-situ and space-based observations, inventory data, model simulations and assimilation techniques to produce regularly updated regional land and ocean carbon budgets, consistent with global budgets. This talk will cover recent examples of studies combining multiple approaches to understand regional and global C-cycle anomalies and their drivers, highlighting the potential of engaging the broader research community towards a second “REgional Carbon Cycle Assessment and Processes” (RECCAP-2) supported by the Global Carbon Project.