Carbon and Other Biogeochemical Cycles
Supplementary Material

Coordinating Lead Authors:
Philippe Ciais (France), Christopher Sabine (USA)

Lead Authors:
Govindasamy Bala (India), Laurent Bopp (France), Victor Brovkin (Germany/Russian Federation), Josep Canadell (Australia), Abba Chhabra (India), Ruth DeFries (USA), James Galloway (USA), Martin Heimann (Germany), Christopher Jones (UK), Corinne Le Quéré (UK), Ranga B. Myneni (USA), Shilong Piao (China), Peter Thornton (USA)

Contributing Authors:
Anders Ahlström (Sweden), Alessandro Anav (UK/Italy), Oliver Andrews (UK), David Archer (USA), Vivek Arora (Canada), Gordon Bonan (USA), Alberto Vieira Borges (Belgium/Portugal), Philippe Bousquet (France), Lex Bouwman (Netherlands), Lori M. Bruhwiler (USA), Kenneth Caldeira (USA), Long Cao (China), Jérôme Chappellaz (France), Frédéric Chevallier (France), Cory Cleveland (USA), Peter Cox (UK), Frank J. Dentener (EU/Netherlands), Scott C. Doney (USA), Jan Willem Erisman (Netherlands), Eugenie S. Euskirchen (USA), Pierre Friedlingstein (UK/Belgium), Nicolas Gruber (Switzerland), Kevin Gurney (USA), Elisabeth A. Holland (Fiji/USA), Brett Hopwood (USA), Richard A. Houghton (USA), Joanna I. House (UK), Sander Hoxmeuling (Netherlands), Stephen Hunter (UK), George Hurtt (USA), Andrew D. Jacobson (USA), Atul Jain (USA), Fortunat Joos (Switzerland), Johann Jungclaus (Germany), Jed O. Kaplan (Switzerland/Belgium/USA), Etsushi Kato (Japan), Ralph Keeling (USA), Samar Khatiwala (USA), Stefanie Kirschke (France/Germany), Kees Klein Goldewijk (Netherlands), Silvia Kloster (Germany), Charles Koven (USA), Carolien Kroeze (Netherlands), Jean-François Lamarque (USA/Belgium), Keith Lassey (New Zealand), Rachel M. Law (Australia), Andrew Lenton (Australia), Mark R. Lomas (UK), Yiqi Luo (USA), Takashi Maki (Japan), Gregg Marland (USA), H. Damon Matthews (Canada), Emilio Mayorga (USA), Joe R. Melton (Canada), Nicolas Metzl (France), Guy Munhoven (Belgium/Luxembourg), Yosuke Niwa (Japan), Richard J. Norby (USA), Fiona O’Connor (UK/Ireland), James Orr (France), Geun-Ha Park (USA), Prabir Patra (Japan/India), Anna Pergo (France/Russian Federation), Wouter Peters (Netherlands), Philippe Peylin (France), Stephen Piper (USA), Julia Pongratz (Germany), Ben Poulter (France/USA), Peter A. Raymond (USA), Peter Rayner (Australia), Andy Ridgwell (UK), Bruno Ringleval (Netherlands/France), Christian Rüdenbeck (Germany), Marielle Saunois (France), Andreas Schmittner (USA/Germany), Edward Schuur (USA), Stephen Sitch (UK), Renato Spahni (Switzerland), Benjamin Stocker (Switzerland), Taro Takahashi (USA), Rona L. Thompson (Norway/New Zealand), Jerry Tjiputra (Norway/Indonesia), Guido van der Werf (Netherlands), Detlef van Vuuren (Netherlands), Apostolos Voulgarakis (UK/Greece), Rita Wania (Australia), Sönke Zaehle (Germany), Ning Zeng (USA)

Review Editors:
Christoph Heinze (Norway), Pieter Tans (USA), Timo Vesala (Finland)

This chapter supplementary material should be cited as:
# Table of Contents

6.SM.1  | Supplementary Material to Section 6.4.6.1: Projections for Formation of Reactive Nitrogen by Human Activity | 6SM-3

References | 6SM-4
6.SM.1 Supplementary Material to Section 6.4.6.1: Projections for Formation of Reactive Nitrogen by Human Activity

**SO$_x$ deposition (kgS km$^{-2}$ yr$^{-1}$)**

1990s

2090s, changes from 1990s

RCP2.6

RCP4.5

RCP6.0

RCP8.5

**N deposition (kgN km$^{-2}$ yr$^{-1}$)**

1990s

2090s, changes from 1990s

RCP2.6

RCP4.5

RCP6.0

RCP8.5

Figure 6.SM.1 | Spatial variability of nitrogen and SO$_x$ deposition in 1990s with projections to the 2090s (shown as difference relative to the 1990s), using the 2.6, 4.5, 6.0 and 8.5 Representative Concentration Pathway (RCP) scenarios, kg N km$^{-2}$ yr$^{-1}$, adapted from Lamarque et al. (2011). Note that no information on the statistical significance of the shown differences is available. This is of particular relevance for areas with small changes.
The change in dissolved inorganic nitrogen (DIN) discharge under the Global Orchestration (GO) scenario of the Millennium Ecosystem Assessment (MEA) (the scenario with the most extreme pressures) was assessed by taking the change between the base year 2000, and the projection year, in this case 2050 (Figure 6.SM.2). Manure is the most important contributor as a result of assumed high per capita meat consumption, although there are considerable regional variations (Seitzinger et al., 2010). At the other extreme is the projected change in the riverine flux between 2000 and 2050 for the Adapting Mosaic scenario, the most ambitious in terms of nutrient managements of the MEA scenarios. These two scenarios provide a range of projections for future DIN riverine fluxes by the year 2050.

Figure 6.SM.2 | (a) Dissolved inorganic nitrogen (DIN) river discharge to coastal zone (mouth of rivers) in 2000, based on Global Nutrient Export from WaterSheds (NEWS) 2 model; change in DIN discharge from 2000 to 2050, based on the (b) Global Orchestration and (c) Adapting Mosaic scenarios from the Millennium Ecosystem Assessment (MEA) (Mayorga et al., 2010, Seitzinger et al., 2010). Units are kg N km⁻² yr⁻¹ of watershed area, as an average for each watershed. Global DIN export to the coastal zone in 2050 under the Global Orchestration and Adapting Mosaic scenarios changes by +5.5 and −0.4 Tg N yr⁻¹, respectively, relative to the export of 18.9 Tg N yr⁻¹ in 2000 (Seitzinger et al., 2010).

References