

EGU23-16920, updated on 24 Sep 2023
<https://doi.org/10.5194/egusphere-egu23-16920>
EGU General Assembly 2023
© Author(s) 2023. This work is distributed under
the Creative Commons Attribution 4.0 License.



Greenhouse gas budget for South Asia region

Atul Jain¹, Jatin Anand¹, Naveen Chandra², and Prabir Patra²

¹Department of Atmospheric Sciences, University of Illinois, Urbana-Champaign, Urbana, USA

²Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Yokohama City, Kanagawa, Japan

Understanding climate change and possible solutions to recent increases in concentrations of major GHG concentrations dependent upon quantifying the emission inventory of these gases. The objective of this study, which is part of the Regional Carbon Cycle Assessment and Processes-2 (RECCAP2) project, is to estimate the country-specific GHGs budget (sources and sinks) for the South Asia (SA) region for the 2010s. The region comprises seven countries: Afghanistan, Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka. Each country in the region is experiencing rapid changes due to the continuous development of agriculture, deforestation, reforestation, afforestation, and the increased demand for land for people to live in. In this study, we synthesize top-down (TD) and bottom-up (BU) model results and ground-based and other data sets to estimate the GHG emissions for carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) due to anthropogenic and natural biospheric activities. Major contributing factors include net biome productivity, fossil fuel emissions, inland waters, and wetland and wet/dry soils. Our study shows that the SA region was the net source of atmospheric CO₂ for the 2010s. BU estimates for CO₂, CH₄, and N₂O emissions were 1974, 1047, and 715 Tg CO₂eq, and TD estimates were 2010, 1247, and 799 Tg CO₂ eq. The total GHG emission for the region based on BP and TD were 3736 and 4056 Tg CO₂ eq. Among SA countries, India was the most significant contributor to the total GHG emission.