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RELEASE OF THE 2nd STATE OF THE CARBON CYCLE REPORT OF USA

The report has been developed with the contribution of UCYs Faculty of Engineering and the Lecturer Yiannis Dialynas

After more than three years of collaboration among several Departments and research institutions in North America, the U.S. Climate Change Research Program just released (<https://carbon2018.globalchange.gov>) the 2nd State of the Carbon Cycle Report (SOCCR-2). SOCCR2 was developed by a team of North America's top experts in carbon (C) cycle science, including Dr Yannis Dialynas, a Lecturer at the University of Cyprus Department of Civil and Environmental Engineering.

This decadal authoritative interagency governmental assessment of the state of the C cycle across North America contributes to the Congressionally-mandated 4th National Climate Assessment (NCA4), which was just released, and emphasizes scientific advances in the understanding of C cycle science, associated human dimensions, and implications to climate change.

SOCCR2 was developed by several universities, research institutions and US Departments including the National Aeronautics and Space Administration (NASA), the US Departments of Energy, Agriculture, and Interior, the US National Science Foundation (NSF), the National Oceanic and Atmospheric Administration (NOAA), the Environmental Protection Agency (EPA), and the US Geological Survey (USGS), among others. It went through six stages of rigorous review by Federal agencies and Departments, the general public, and an external expert review panel convened by the US National Academies of Sciences, Engineering, and Medicine.

The Report focuses on North American land and adjacent oceans' C cycle processes, stocks, fluxes and interactions with global-scale C budgets, and climate change impacts in managed and unmanaged systems. Specifically it assesses: (i) Major elements of the global C cycle (primarily carbon dioxide and methane) and key interactions with climate forcing and feedback components from a global perspective; (ii) Assessment of the N. American C cycle, including short- to long-term and local, regional, and national perspectives on key C stocks and fluxes; (iii) C in unmanaged and managed systems - estimates of major stocks, fluxes, uncertainties, broader social drivers, and effects of past management decisions; and (iv) Interactions and disturbance impacts, and C cycle management practices, tools, and needs at various scales. The Report assesses the extent to which biogeochemical cycles and human activity affect ecosystems under climate



change, discusses associated socio-economic implications, and makes projections to help agencies and stakeholders globally understand the latest carbon science and make decisions.

Dr Dialynas' contribution to SOCCR2 (Chapter 12: Soils) focuses on his recent findings on the potential of land management practices to mitigate climate change, offsetting the anthropogenic CO₂ release to the atmosphere. Specifically, the continuous increase in atmospheric CO₂ concentrations is one of the main drivers of global warming. According to Dr Dialynas' research, hydrologically-driven soil erosion leads to soil organic C transport and burial in depositional areas at rivers and lakes globally. As soil organic C is preserved with burial, this entire process may lead to a net atmospheric C sink, which can explain an important missing link on the global C cycle, with critical impacts on climate change.

Dr Yannis Dialynas is a Lecturer at the Department of Civil and Environmental Engineering in University of Cyprus. He received his Ph.D. degree in Hydrology and Water Resources Engineering at Georgia Institute of Technology in 2017 under the advising of Provost Rafael Bras, his M.Sc. in Civil Engineering at Georgia Institute of Technology in 2013, and his B.S. in Civil Engineering at the National Technical University of Athens in 2011. In 2016 he received NASA's Earth & Space Science Fellowship for his interdisciplinary research about the influence of hydrologic processes on the C cycle.
