

Pan-Arctic distributions of continental runoff in the Arctic Ocean

Cédric G. Fichot^{1*}, Karl Kaiser^{1,4}, Stanford B. Hooker³, Rainer M. W. Amon⁴, Marcel Babin^{5,6},
Simon Bélanger⁷, Sally A. Walker^{4,8}, and Ronald Benner^{1,2}

Supplementary Information

Affiliations:

¹Marine Science Program, University of South Carolina, Columbia, South Carolina, 29208, USA.

²Department of Biological Sciences, University of South Carolina, Columbia, South Carolina, 29208, USA.

³Ocean Ecology Laboratory, NASA Goddard Space Flight Center, Greenbelt, Maryland, 20771, USA.

⁴Departments of Marine Sciences and Oceanography, Texas A&M University, Galveston, Texas, 77553, USA.

⁵Takuvik Joint International Laboratory, UMI 3376, Université Laval (Canada) - CNRS (France), Département de Biologie and Québec-Océan, Université Laval, G1V 0A6, Canada.

⁶Laboratoire d'Océanographie de Villefranche, UMR 7093, Université Pierre et Marie Curie (Paris 6)/Centre National de la Recherche Scientifique (CNRS), Villefranche-sur-Mer Cedex, 06230, France.

⁷Department of Biology, Chemistry and Geography, Université du Québec à Rimouski, Rimouski, Québec, G5L 3A1, Canada.

⁸Department of Oceanography, Dalhousie University, Halifax, Nova Scotia, B3H 4R2, Canada.

*Correspondence to: cgfichot@gmail.com

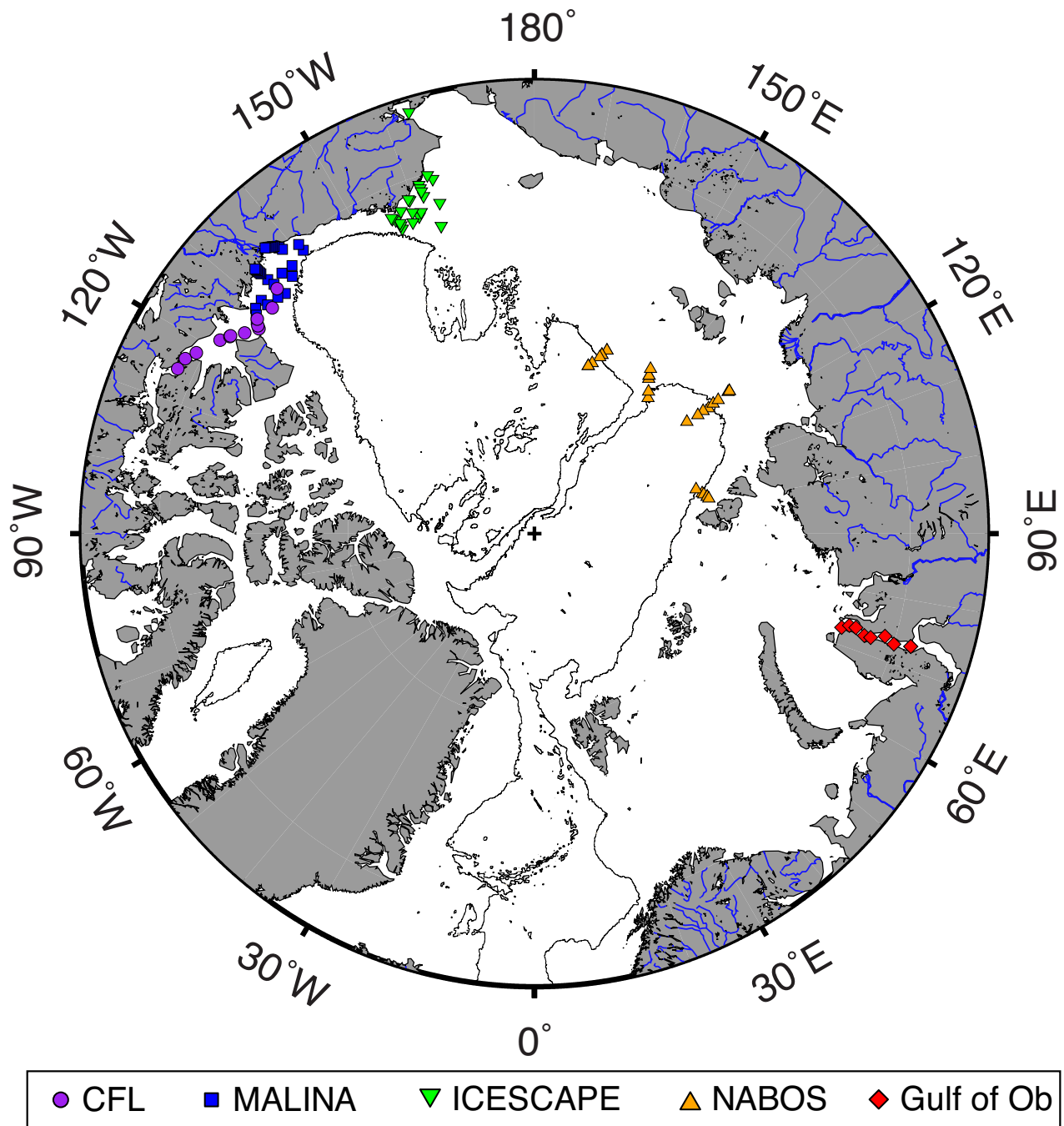


Figure S1 — Stations where samples were collected and analyzed for DOC, CDOM and lignin measurements. Data collected from these stations were used to establish the relationship between $S_{275-295}$ and $TDL P_9-C$ (see Fig. 1a). Surface water samples were acquired in the Gulf of Ob in September 2005 and during several field expeditions to the Arctic Ocean between 2008 and 2010. The field expeditions included the Circumpolar Flaw Lead (CFL) system study in the Amundsen Gulf and Beaufort Sea during July and August 2008 (Leg 10), the Nansen and Amundsen Basin Observational System (NABOS) program along the Eurasian shelves during October 2008, the Malina research program in the Beaufort Sea in August 2009, and the Impacts of Climate on the Eco-Systems and Chemistry of the Arctic Pacific Environment (ICESCAPE) program in the Chukchi Sea during June and July 2010. Stations are grouped by research program.

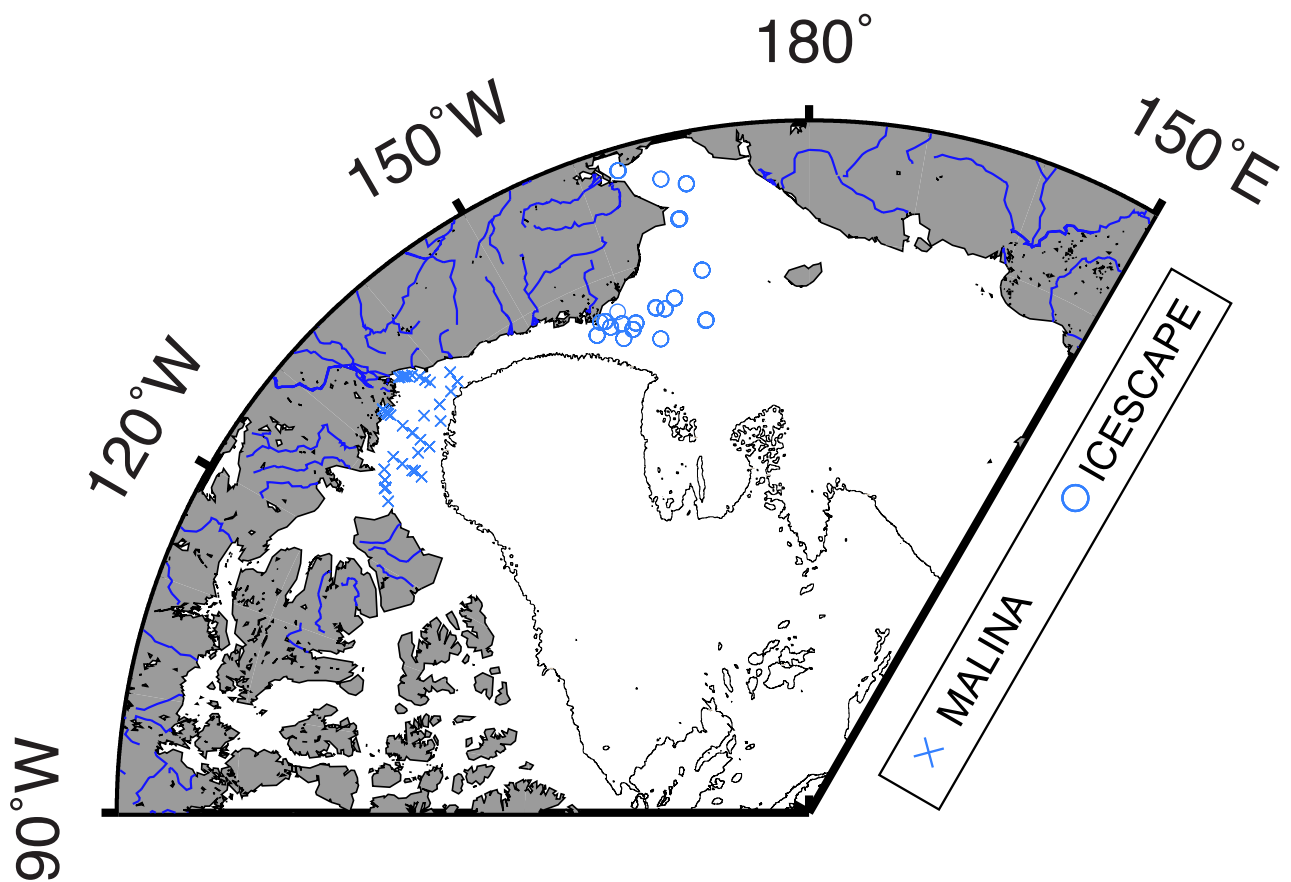


Figure S2 — Stations where remote-sensing reflectances and CDOM absorption coefficients were measured. Data collected from these stations were used to develop the $S_{275-295}$ algorithm (see Fig. 1b). Optical profiles and surface water samples were acquired as part of the Malina research program in the Beaufort Sea in August 2009 and the Impacts of Climate on the Eco-Systems and Chemistry of the Arctic Pacific Environment (ICESCAPE) program in the Chukchi Sea during June and July 2010. Stations are grouped by research program.

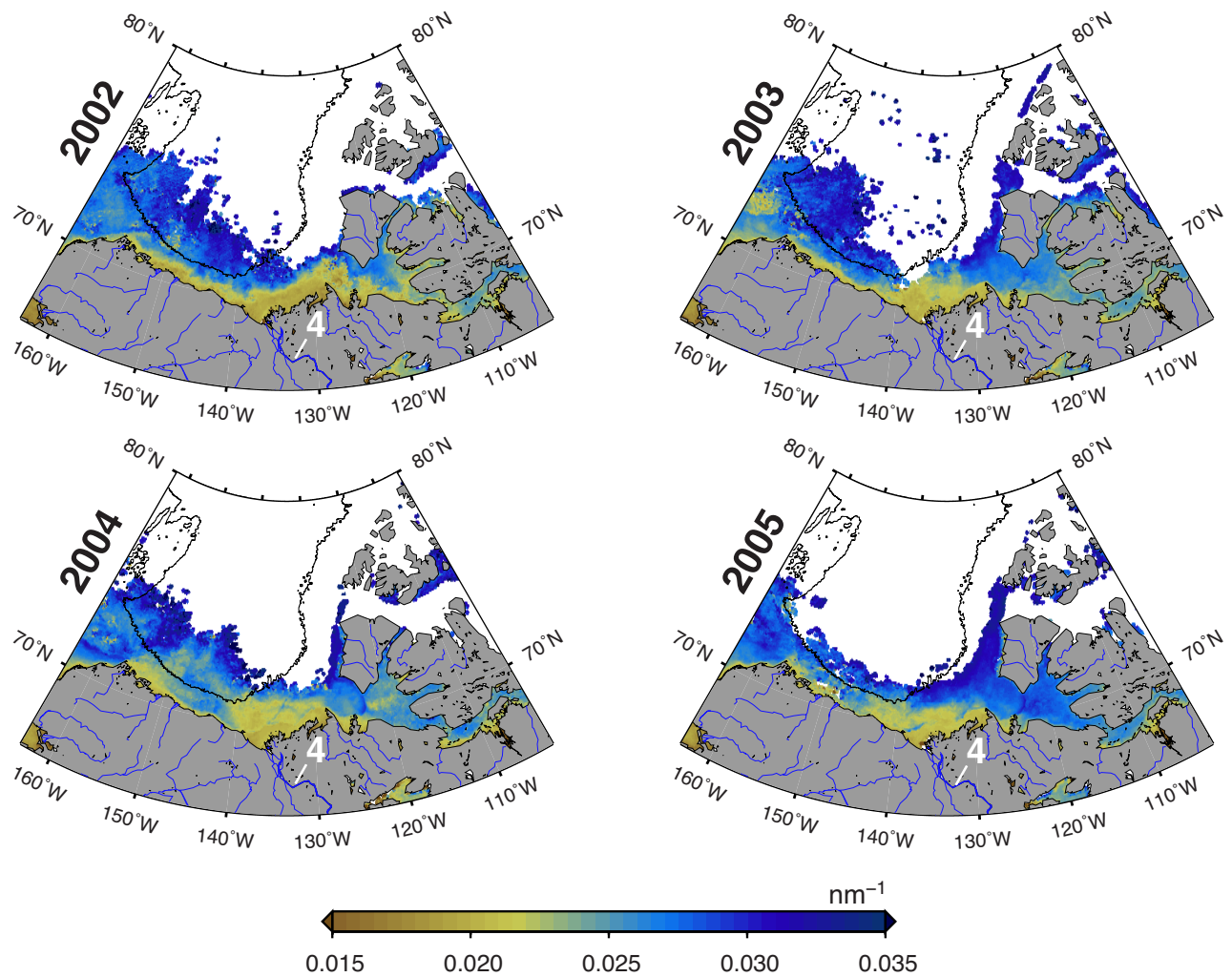


Figure S3 — Routing and distribution of Mackenzie River runoff between 2002 and 2005. The Mackenzie River runoff was predominantly eastward toward the Canadian Arctic Archipelago from 2002 to 2005. The $S_{275-295}$ algorithm was implemented using 4-km resolution, yearly-binned, MODIS Aqua ocean color. The Mackenzie River is labeled (4). The contour line represents the 2000-m isobath and outlines the Canada Basin.

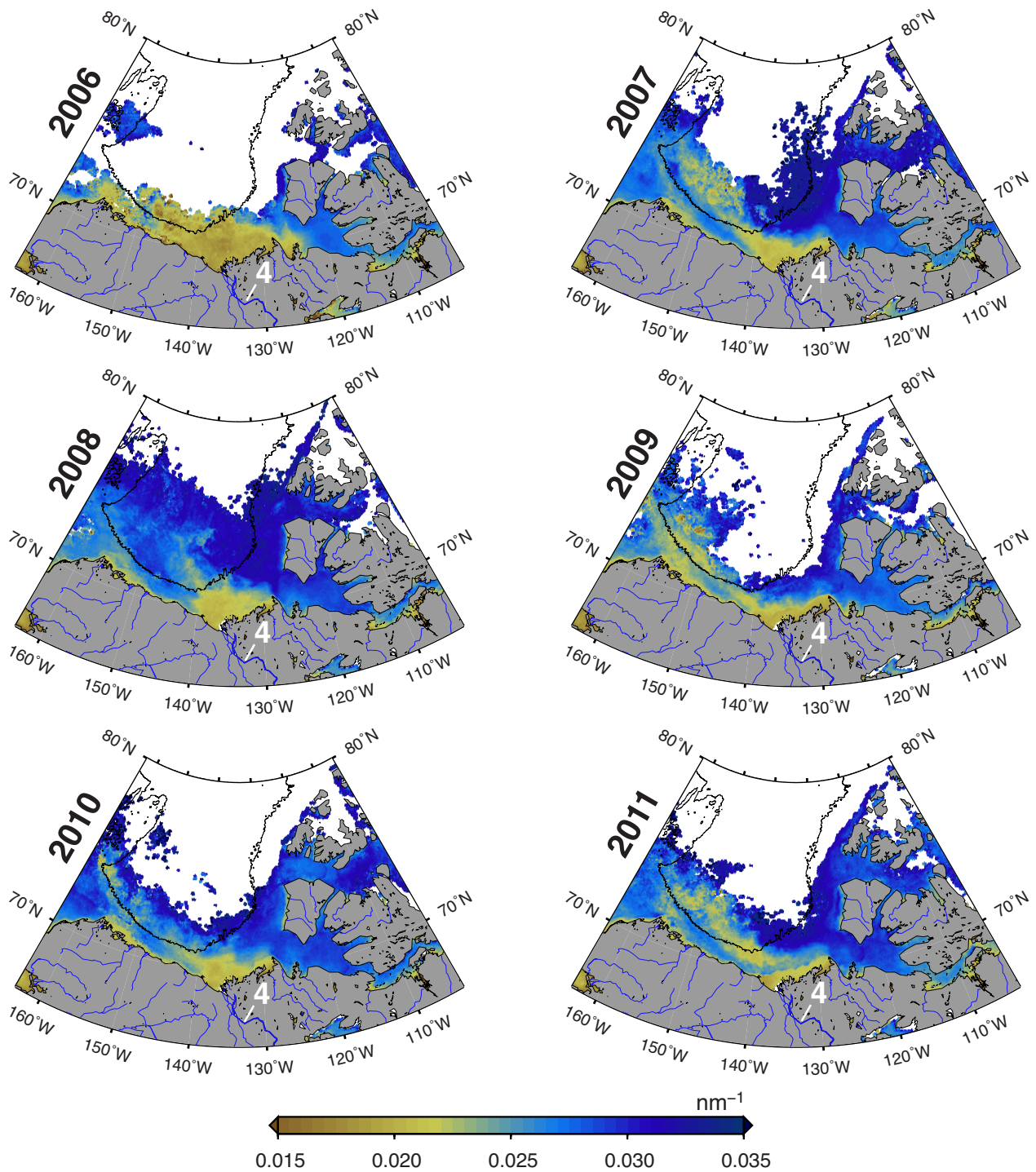


Figure S4 — Routing and distribution of Mackenzie River runoff between 2006 and 2011. The Mackenzie River runoff was repeatedly routed northwestward to the Canada Basin between 2006 and 2011. The $S_{275-295}$ algorithm was implemented using 4-km resolution, yearly-binned, MODIS Aqua ocean color. The Mackenzie River is labeled (4). The contour line represents the 2000-m isobath and outlines the Canada Basin.