

## C07-O03

### **FRESH WATER AND ITS ROLE IN THE ARCTIC MARINE SYSTEM: SOURCES, DELIVERY, DISPOSITION, STORAGE, EXPORT, AND PHYSICAL AND BIOGEOCHEMICAL CONSEQUENCES IN THE ARCTIC AND GLOBAL OCEANS**

Eddy Carmack (*Fisheries and Oceans Canada, Canada*)

Michiyo Yamamoto-Kawai (*Tokyo University of Marine Science and Technology, Japan*)

Sheldon Bacon (*National Oceanography Centre, United Kingdom*)

Bodil Bluhm (*School of Fisheries and Ocean Sciences, University of Alaska Fairbanks, United States*)

Thomas Haine (*Earth and Planetary Sciences, Johns Hopkins University, United States*)

Camille Lique (*Department of Earth Science, University of Oxford, United Kingdom*)

Humfrey Melling (*Fisheries and Oceans Canada, Canada*)

Igor Polyakov (*International Arctic Research Center, University of Alaska, United States*)

Faimma Straneo (*Woods Hole Oceanographic Institution, United States*)

Mary Louise Timmermans (*Department of Geology and Geophysics, Yale University, United States*)

William Williams (*Fisheries and Oceans Canada, Canada*)

eddy.carmack@dfo-mpo.gc.ca

The Arctic marine system is a fundamental node in the global hydrological cycle and ocean thermohaline circulation. A new, jointly initiated scientific assessment entitled the “*Arctic Freshwater Synthesis (AFS)*”, which is focused on assessing the various Arctic freshwater sources, fluxes, storages and effects. The ocean component of this synthesis effort summarizes the delivery of fresh and low salinity waters to the Arctic Ocean by river inflow, net precipitation, distillation during the freeze/thaw cycle and Pacific inflows; then examines the disposition and storage of freshwater components within the Arctic Ocean; and finally discusses the release and export of freshwater components into the convective domains of the North Atlantic. Within the Arctic Ocean there are few physical, chemical or biological processes that are not constrained by the local quantities and geochemical qualities of fresh water; these include: stratification and vertical mixing, ocean heat flux, primary production and ocean acidification. Observed and modelled changes in this system are discussed on seasonal, annual and centennial time scales, with emphasis on linking the marine system to atmospheric, terrestrial and cryospheric systems.