

ARCTIC SEA ICE DYNAMICS FOR GLOBAL CLIMATE MODELS: RESULTS FROM THE GLOBICE PROJECT

S.Baker⁽¹⁾, S.Laxon⁽²⁾, A.Muir⁽²⁾, A.Ridout⁽²⁾, R.Kwok⁽³⁾

(1) University College London, MSSL, Holmbury St. Mary, Dorking, RH5 6NT, UK.

(2) University College London, Earth Sciences, Gower St. London WC1E 6BT, UK.

(3) Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Dr, Pasadena, CA 91109, USA.

A key objective of the CliC programme is to improve the representation, in global climate models, of interactions between sea ice, the oceans and the atmosphere [1]. Due to the high albedo of sea ice, low thermal conductivity, and its affect on the thermohaline budget, sea ice profoundly affects the exchanges of heat, water, and momentum between the ocean and atmosphere, and plays an important role in oceanic convection and deep-water formation.

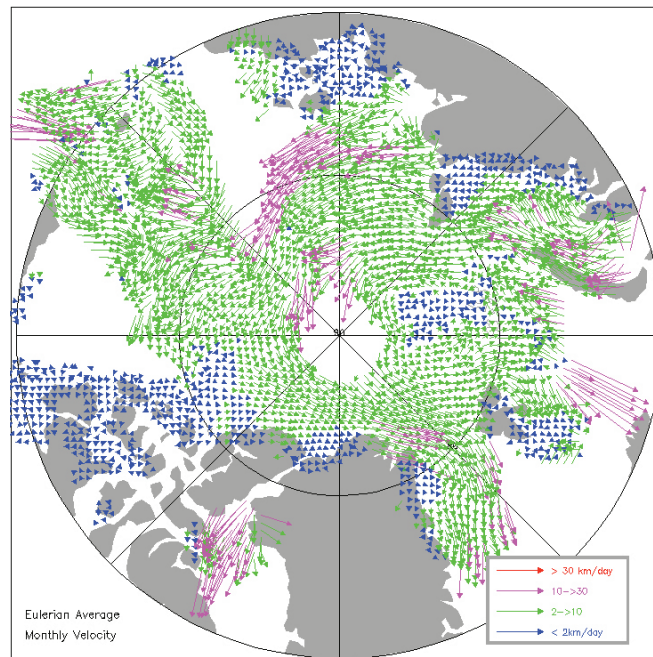


Figure 1. Eulerian motion during January 2009

The GlobICE Project is a part of ESA's Data User Element (DUE) of the Earth Observation Envelope Programme. The main purpose of GlobICE is to derive information on Sea Ice data sets that will improve understanding of the role of the Arctic in global climate in support of CliC and World Climate Research Programme objectives. The input to the project is earth observation data mainly from ESA's ENVISAT ASAR archives and supplemented by Radar Altimeter data.

The output from the programme is similar to the RadarSat Geophysical Processor System (RGPS) [2]. The main products from the project are Eulerian (figure 1) and Lagrangian ice motions, ice deformation, including open water fraction, and mass fluxes at key gateways [3, 4].

This paper will describe the family of GlobIce data products, present their potential applications, and summarise the feedback from Climate Modellers and other key user groups who have assessed the products.

[1] The Climate and Cryosphere (CliC) Project, <http://clic.npolar.no/>.

[2] R. Kwok and T. Baltzer, "The Geophysical Processor System at the Alaska-Sar-Facility," *Photogrammetric Engineering and Remote Sensing*, vol. 61, pp. 1445-1453, 1995.

[3] R. Kwok, "Arctic sea-ice area and volume production: 1996/97 versus 197/98," *Annals of Glaciology*, Vol 34, 2002, vol. 34, pp. 447-453, 2002.

[4] R. Kwok, W. Maslowski, and S. W. Laxon, "On large outflows of Arctic sea ice into the Barents Sea," *Geophysical Research Letters*, vol. 32, 2005.