A novel circumpolar map for upscaling of carbon fluxes and pools

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A circumpolar representative and consistent wetland map is required for a range of applications spanning from upscaling of carbon fluxes and pools to climate modeling and wildlife habitat assessments. Currently available datasets lack sufficient accuracy in many regions of the Arctic. Synthetic Aperture Radar data from satellites have already been shown to be suitable for wetland mapping. ENVISAT Advanced SAR (ASAR) provides global medium resolution data, which in this study is examined with particular focus on wetness patterns. A novel wetness level classification has been developed using ASAR backscatter statistics within the framework of PAGE21 (www.page21.eu). The wetness level product distinguishes between three wetness classes 'wet', 'medium' and 'dry' and a class 'other' which mostly covers flat sandy soils. The comparison with conventional vegetation maps, such as the Circumpolar Arctic Vegetation Map, Northern Land Cover of Canada-Circa 2000, the (USGS) vegetation map of Alaska, GBFM Siberia and the thematic map of wetlands throughout Alaska showed promising results. For instance the comparison with the (USGS) vegetation map of Alaska showed that the class of 'wet sedge tundra' consisted of over 60% wet class pixels and only less than 10% dry pixels, while the non-wet class of 'closed spruce & hemlock forest' showed over 80% dry class pixels and less than 10% wet pixels. This novel map may be utilized for wetland related circumpolar land-atmosphere exchange studies.