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Arctic dimension of global warming

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The Arctic is coupled with global climate system by the atmosphere and ocean circulation that provides a major contribution to the Arctic energy budget. At this basis the Arctic amplification is associated with the increasing of atmospheric meridional transport from low latitudes using new circulation indices. In contrast the winter warming in the middle latitudes is amplified by zonal heat transport intensification. Moreover the global warming is amplified by an increase of the meridional and zonal heat transports. Hence we are deal with dynamical amplification of the warming of a sort. Dynamic contribution to the recent warming in the Arctic, Northern Hemisphere and the globe are estimated using new indices, reanalysis and global climate model data. It is shown significant part of the annual surface air temperature trend for 1969-2008 in these areas can be attributed to dynamical amplification. The Arctic warming is increased also by incoming longwave radiation due to an increase of humidity and cloudiness in the Arctic atmosphere. The warming is amplified additionally from October to January as a result of ice edge retreat from the Siberian and Alaska coast and the heating of expanded volume of sea water. In conclusion the scheme of the Arctic amplification in response to the increasing meridional heat and moisture transport from low latitudes and originated feedbacks in the Arctic climate system is presented.