2015 Sea Ice Outlook
June Submission

*** Contributor :
Rob Dekker, individual

*** Executive Summary :
I've been concerned by the steep decline of Arctic sea ice over the past decades, and wondered how exactly the Arctic amplification of GHG induced global warming contributes to that decline.

For that, I reasoned that Arctic amplification during the Arctic melting season may come from a decrease in NH albedo, and thus, that we should see this amplification reflected in land snow cover in spring and early summer.

For this projection, I used the monthly April and May snow cover data from Rutgers snow lab, as well as the NSIDC monthly Extend-minus-Area (as a metric to estimate the presence of open water such as leads and melting ponds), over the 1995-2012 period known September extent data.

This method is based on the physics of albedo amplification, and obtains a 470 k km^2 standard deviation in the prediction, which is better than most other methods, albeit not that much better better than a simple "linear trend" prediction.

The important result is that spring snow cover signal is present in the September Arctic sea ice extent.

*** Type of Outlook :
Statistical model, using mainly NH snow cover as input variable.

*** September 2015 monthly average projection :

Arctic Ice EXTENT : 4.9 million km^2

Standard Deviation : 470 k km^2.

*** Short explanation of outlook method :

I've been concerned by the steep decline of Arctic sea ice over the past decades, and wondered how exactly the Arctic amplification of GHG induced global

warming contributes to that decline.

For that, I reasoned that Arctic amplification during the Arctic melting season may come from a decrease in NH albedo, and thus, that we should see this amplification reflected in land snow cover in spring and early summer.

For my method, I'm assuming that most ice that melts between May and September is FYI, and I'm assuming that the effective thickness of that ice did not change much over the past two decades.

With these assumptions, the only form of Arctic amplification can come from the amount of heat absorbed by the Northern Hemisphere during the melting season, which should depend on Northern Hemisphere snow cover decline, and forming of melting ponds and polynia on melting sea ice.

In support of that theory, using linear regression data available in spring, NSIDC September Arctic sea ice extent correlates best against Rutgers' lab NH snow cover data (R=0.88 using April and May NH snow data).

This correlation makes physical sense, since land snow cover strongly affects albedo during spring and summer, and thus the amount of heat the Northern Hemisphere absorbs during the melting season.

And the correlation is so good that it triggered me to file this submission.

*** Projection uncertainty/propability estimate :

Using simple regression of Rutgers Snow Lab April and May data for NH snow cover over the 1995-2012 sea ice extent and area data from NSIDC, I obtain a prediction for September sea ice EXTENT of just 470 k km^2 standard deviation. For the sea ice AREA prediction, the correlation is even better, with standard deviation of 371 k km^2.