Arctic Ice Extent Outlook

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1. Value of the Arctic Ice extent in September 2008 will be lower than those in corresponding period of 2007. It is evident from data presented in below *table.* For example, an ice extent retreat between March and April in 2007 was equal to 0.8, but it was only– 0.7 in 2008. Moreover, Atlantic-Pacific passage (Northern Sea Route) through Russian margin seas will be open in narrower mode than in past 2007 year as it can be seen from SSMI ice concentration pictures (*fig.1*).
   Most probable scenarios is that the ice extent in Atlantic sector of Arctic will not be reduced, but in Pacific sector it will be slightly increased or remained at the level of 2007 year. However, there are some other impact factors, which are not yet taken into account (e.g. ice thickness or SSMI ice concentration data, ice melting by warm underwater streams).

Table. Comparison of the Arctic ice extent values between winter and spring months of 2007 and 2008.

Year/month	Arctic Ice extent (million sq. km)
2007/Feb	14.5
2008/Feb	15.0
2007/March	14.7
2008/March	15.2
2007/April	13.9
2008/April	14.5

3. Major factors used for ice extent outlook mentioned above:
   - More ice extent in Bering Sea in 2008 with respect to 2007
   - Atmospheric pressure fields (*fig.2a, b*) and circulations (*fig.3a, c*) in March-April in Pacific sector of Arctic were substantially different between 2007 and 2008. In 2007 there was a persistent cyclone over Bering Sea determined a sustainable northward flow of warm air from low latitudes (*fig.3a, b*). In contrast, there was an anticyclone stabilized in April 2008. Therefore, an atmospheric flow from South-East Asia to Arctic appeared in April of 2008 (e.g. later than in 2007).
   - Surface water salinity in Pacific sector of Arctic was lower in last autumn than in previous year because of more intensive ice melting in August and September. Seasonal ice in winter should be thicker last winter.
   - SSMI ice concentration picture (*fig.1*) leads to opposite conclusion. Actually, arctic ice in Pacific sector is rather thin now. Therefore, its destruction is more or less probable under condition of last year atmospheric circulation regime will be repeated.
   - The SAT field of 2008 April has lower positive anomaly in domain of Chukchi and Bering seas (*fig.4a*). Meanwhile, much more strong SAT positive anomaly was occurred in past year corresponding field over Kara Sea and Eastern Siberia (*fig.4b*).
4. Thus an above outlook is rather uncertain. There is a shortage of data on:
   - Ice thickness
   - Water temperature in Atlantic core layer within Arctic Ocean.

   Highly developed self-learning prediction model is needed. I would suggest to employ a fuzzy-neural type of model in this study due to its highly flexibility.

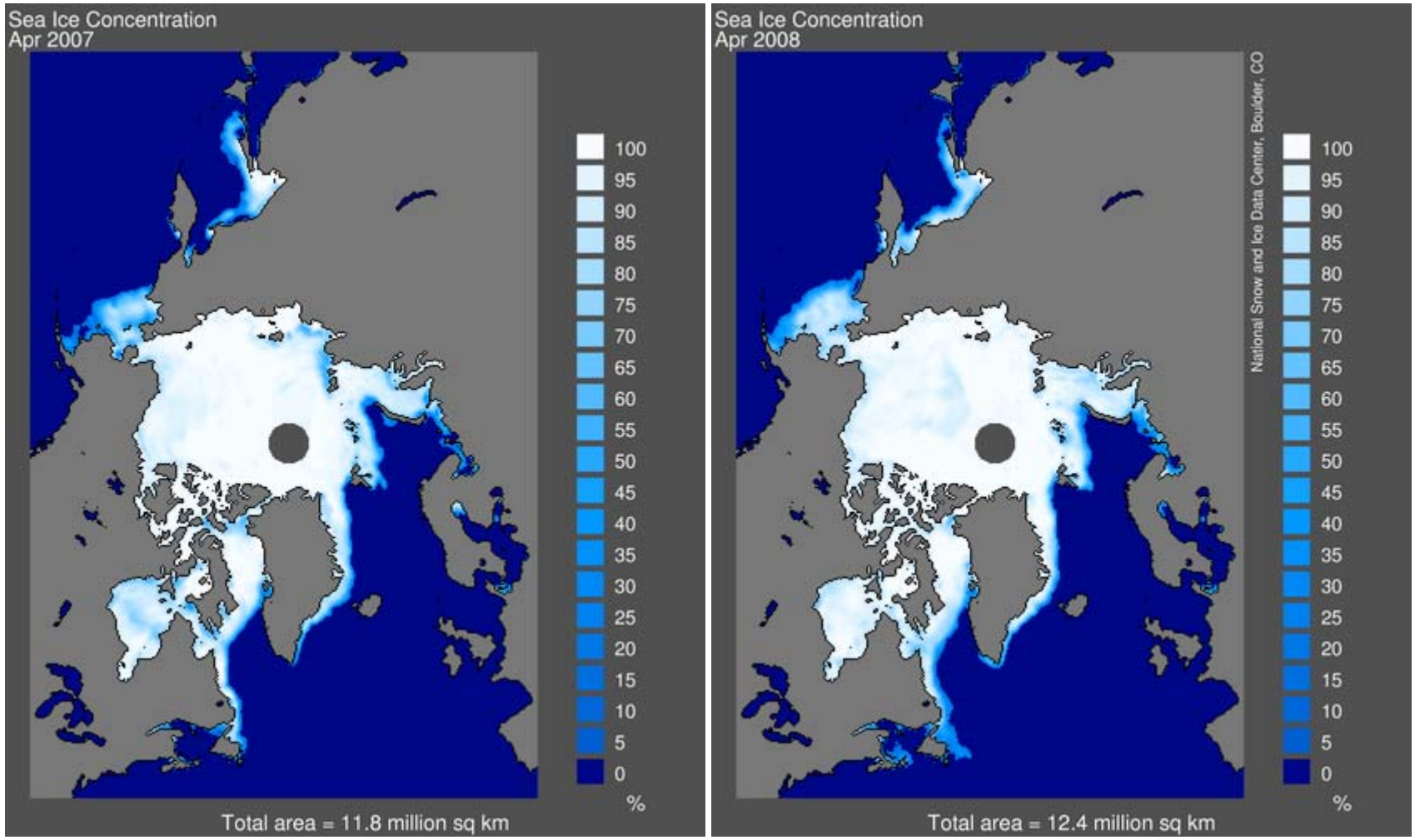

Figure 1. Comparison of ice concentrations between April 2007 and April 2008

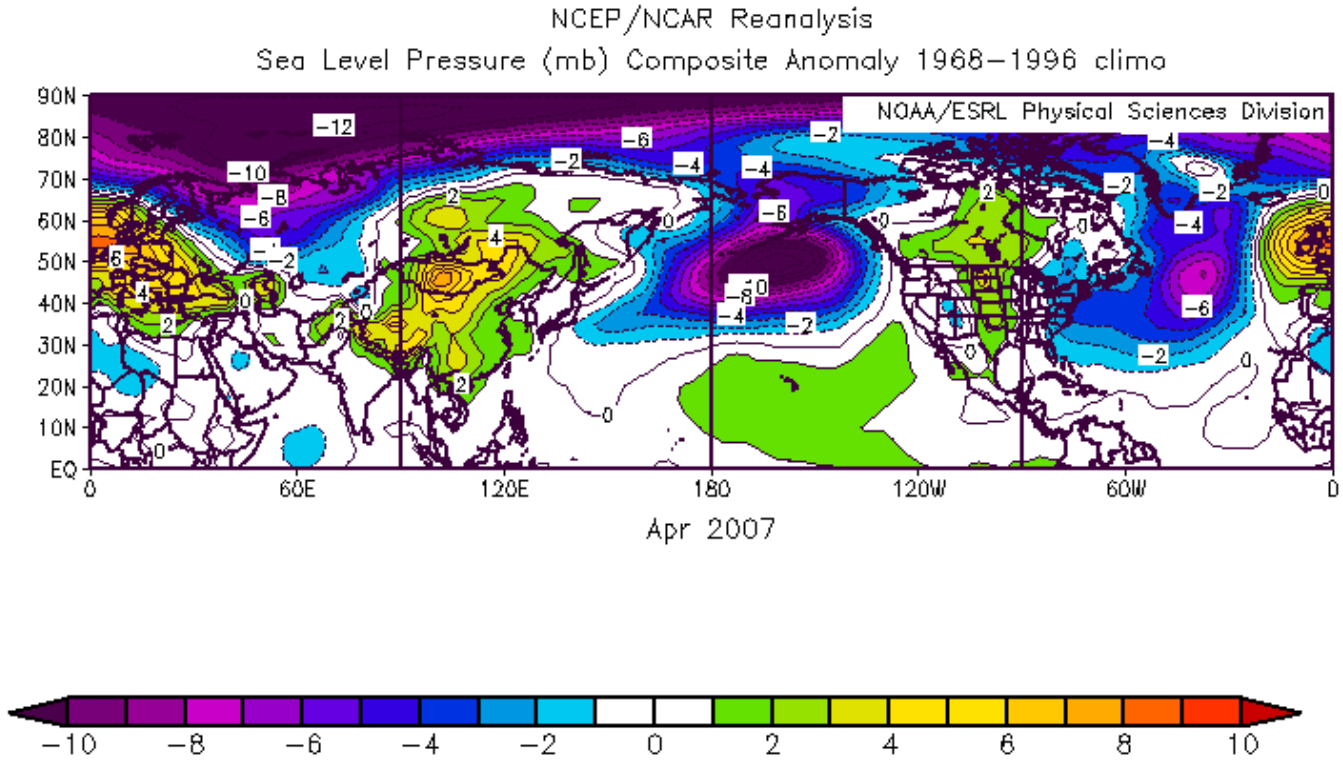
NCEP/NCAR Reanalysis
Sea Level Pressure (mb) Composite Anomaly 1968–1996 climo
NOAA/ESRL Physical Sciences Division
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Fig.2a

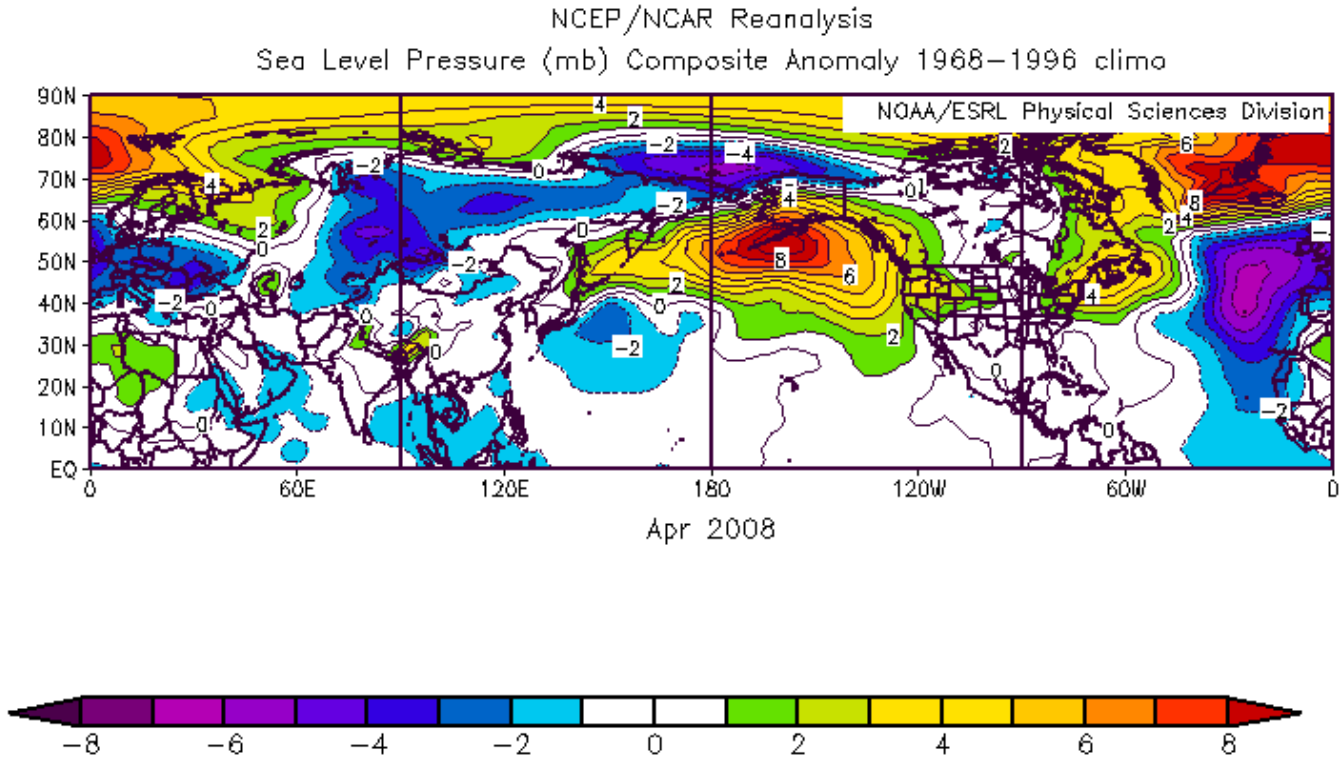
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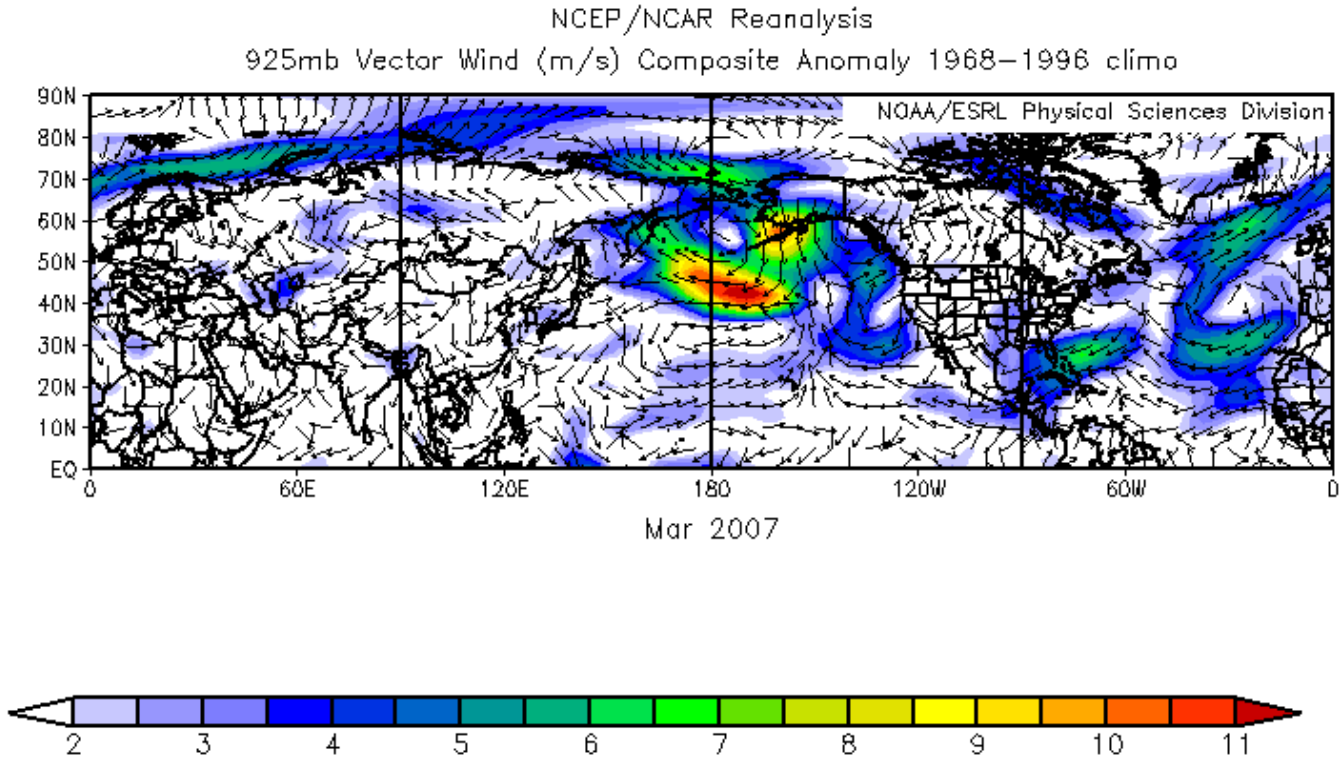
Fig.2b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925mb Vector Wind (m/s) Composite Anomaly 1968–1996 climo
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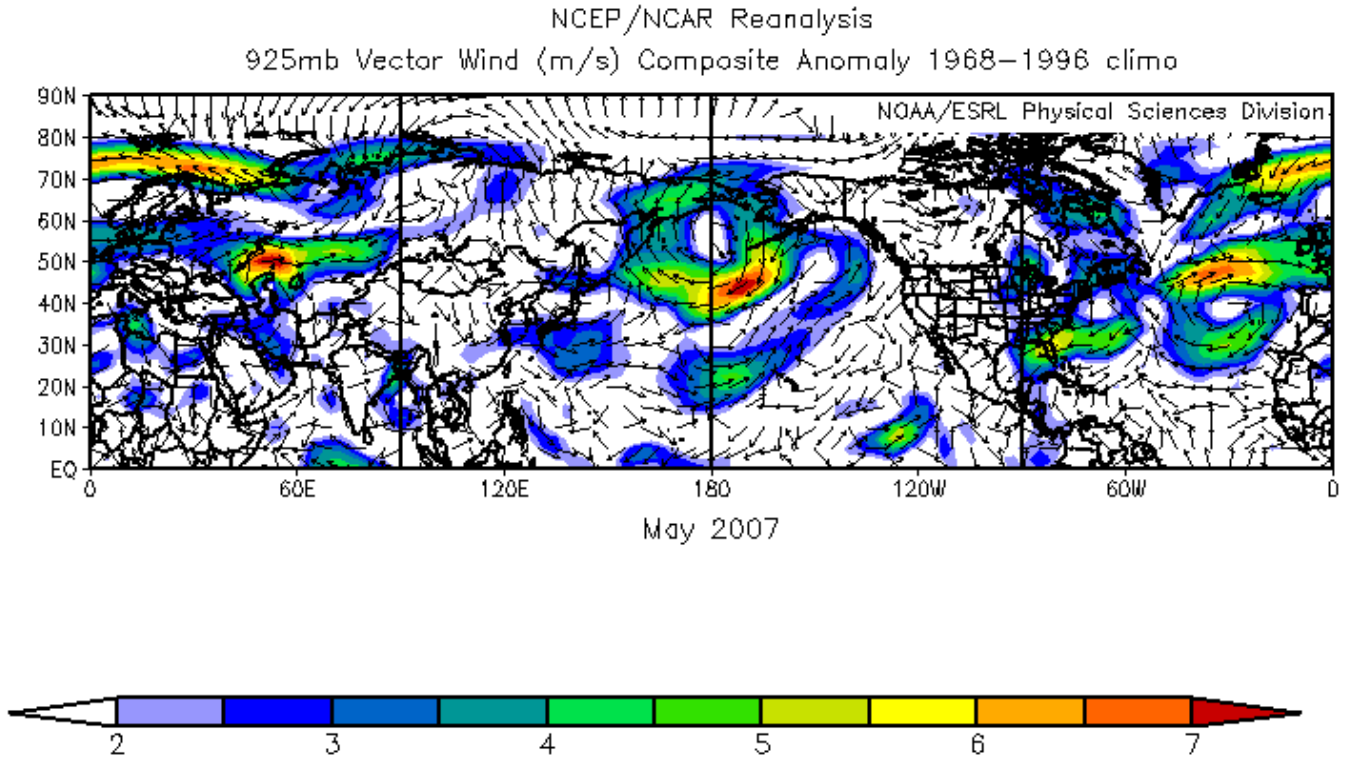
Fig.3a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925mb Vector Wind (m/s) Composite Anomaly 1968–1996 climo
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Fig.3b

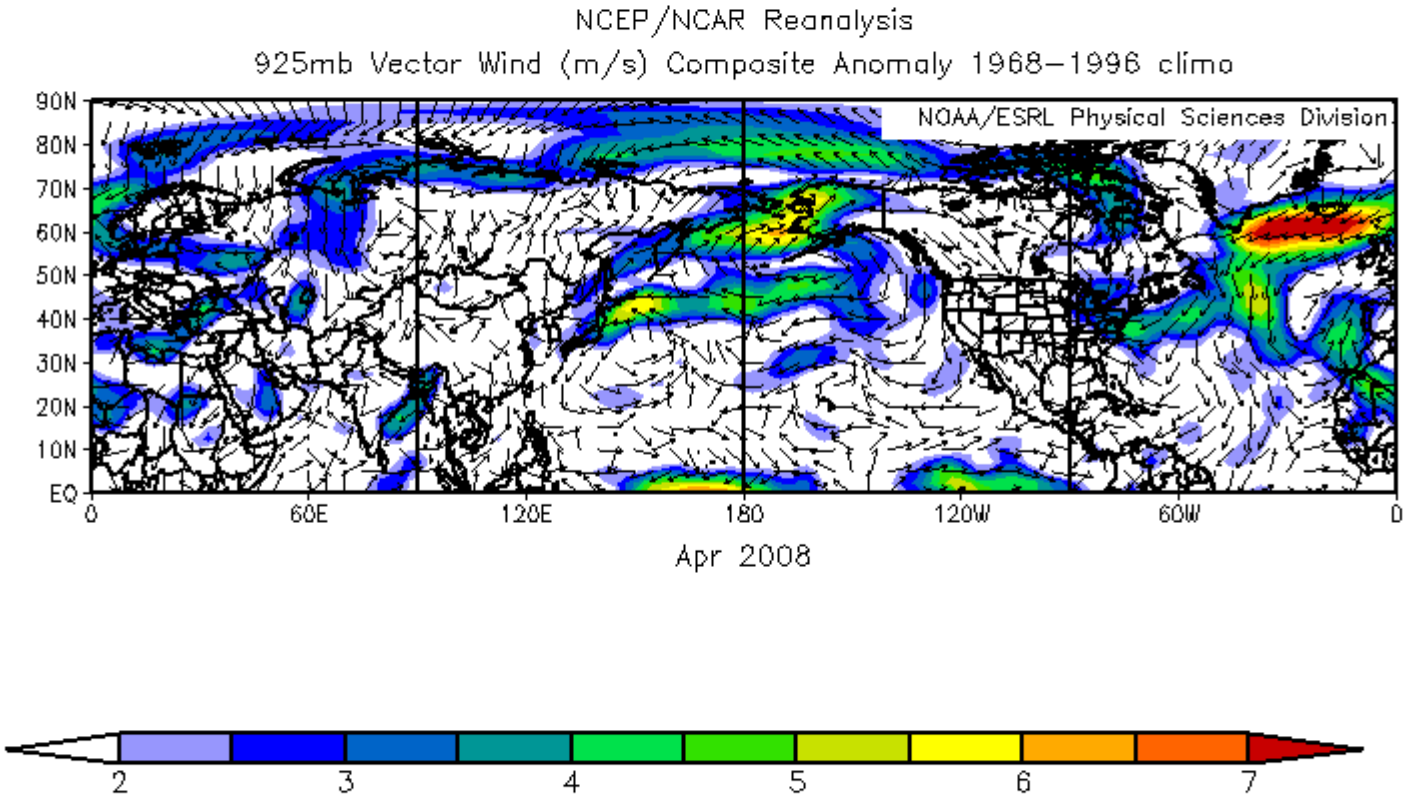
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Fig.3c

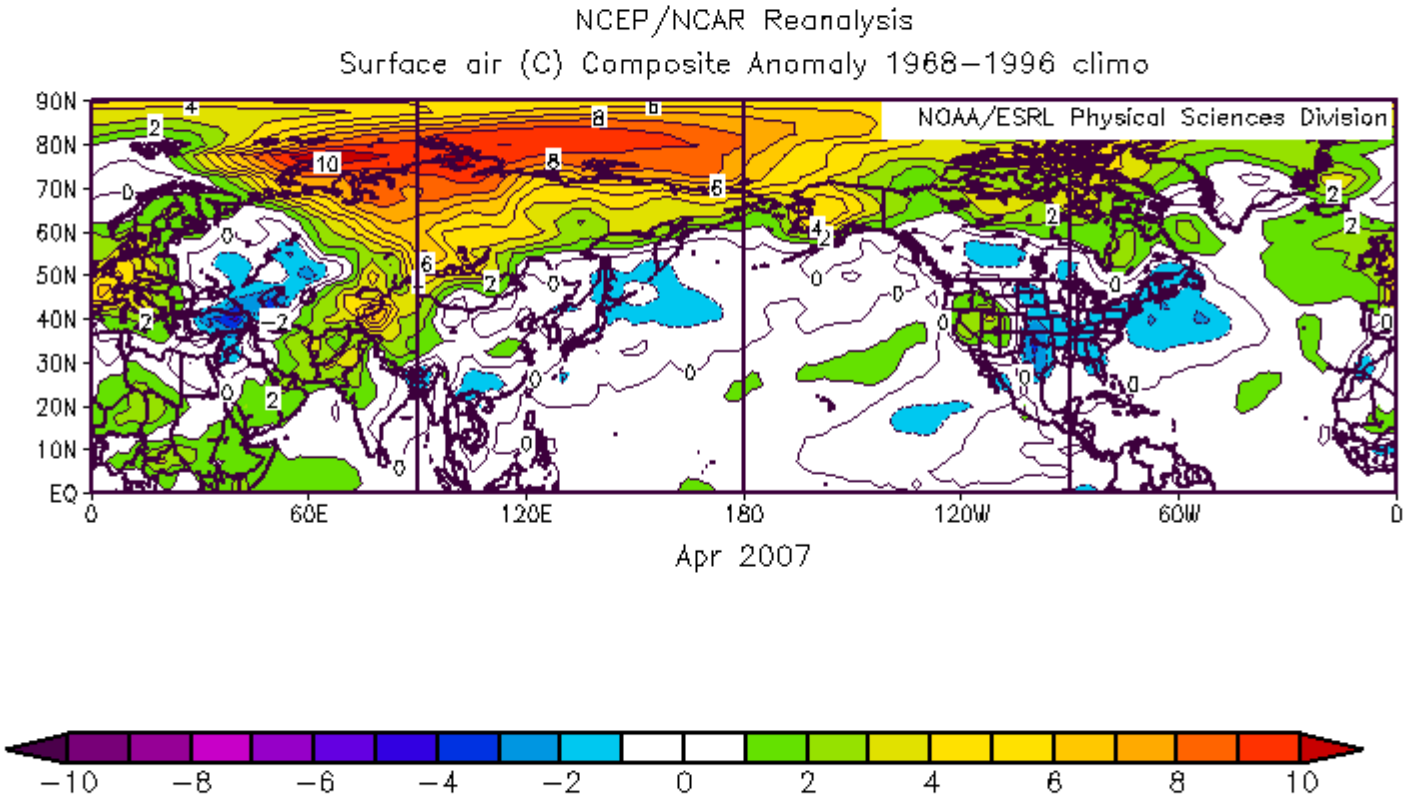
NCEP/NCAR Reanalysis
Surface air (C) Composite Anomaly 1968–1996 climo
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Fig.4a

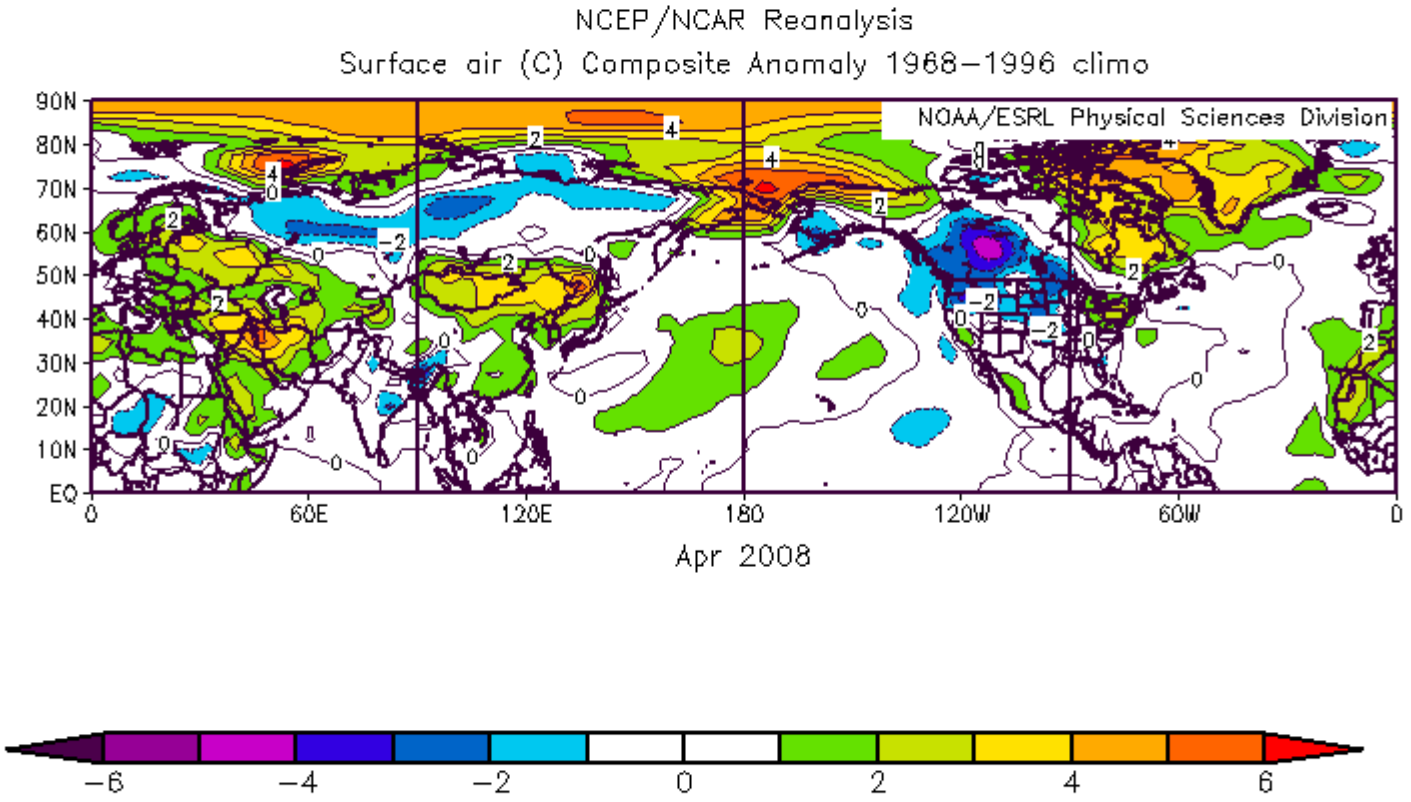
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Fig.4b