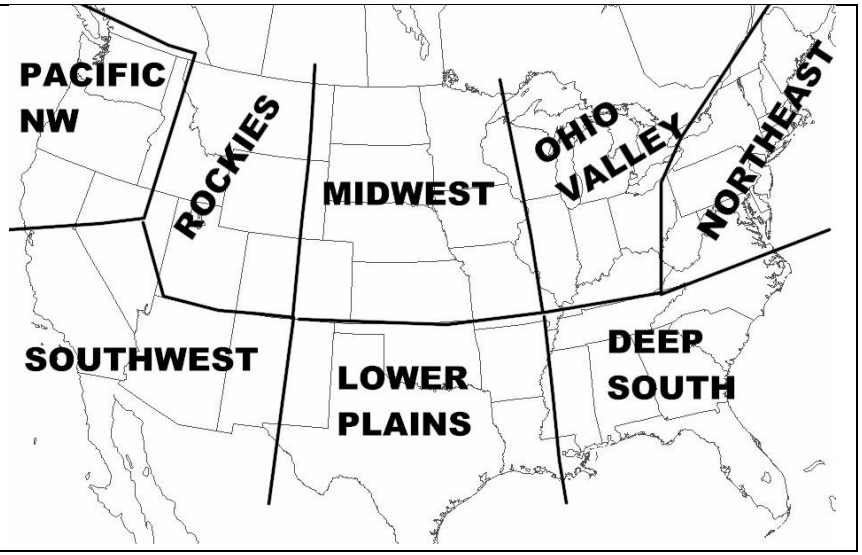
WxRisk.com Weather Forecasting For Traders, Investors, and Businesses

CONUS ENERGY 11/27/17

MBN= Much Below Normal BN= Below Normal NN= Near Normal AN= Above Normal MAN= Much Above Normal
+ High Confidence - Low Confidence Italicized= MAJOR change from previous

ZONE	1-5D	previous	6-10D	previous	11-5D	previous
PACIFIC NW	NN	NN	BN	BN	NN	MBN
SOUTHWEST	AN	NN	MBN	NN	NN	NN
ROCKIES	AN	MAN	BN	AN	NN	NN
MIDWEST	AN	AN	AN	MAN	NN	NN
L.PLAINS	BN	AN	NN	MAN	BN	NN
OHIO VALLEY	BN	NN	AN	MAN	MBN	NN
DEEP SOUTH	NN	AN	AN	MAN	MBN	NN
I-95	NN	AN	AN	NN	MBN	NN



DISCUSSION

During the long thanksgiving weekend there has been significant changes in the weather models. The speculation from Mid November that the pattern would turn somewhat colder by the middle of December has become a raging torrent across much of the social media with various meteorologists commenting on the significant changes developing in the overall pattern. In

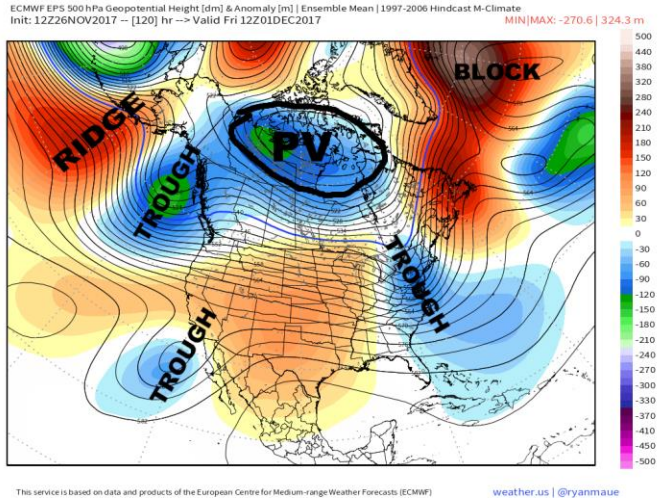
other words while the first week of December is likely feature large areas of above and much above normal temperatures from the Rockies to the East Coast ...the real focus in the energy markets are clearly going to be the developing colder pattern which is likely to occur by the middle of December. There is still quite a bit of uncertainty as to how cold the pattern will be as well as the duration of the cold and whether or not there will be any significant winter storms accompanying the cold. But the data is pretty strong for this far out in time that a significant shift to a substantially colder pattern is coming and the idea that December was going to be a warm month is rapidly turning into crap.

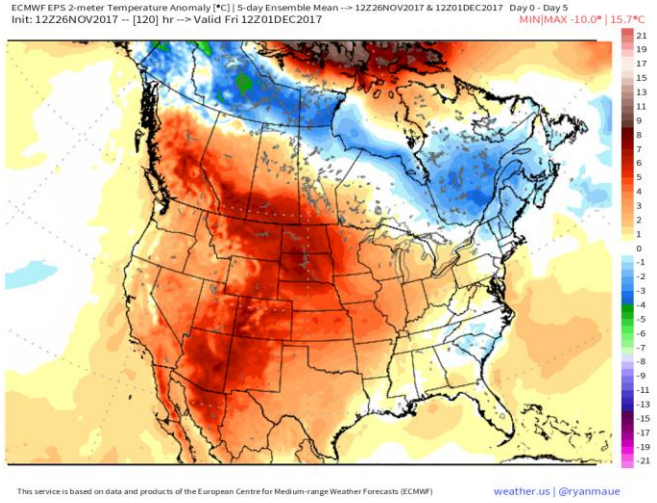
1-5 DAY

The 1-5D jet stream (LEFT) and surface temperature anomaly maps (RIGHT0 show the warm pattern developing as we close out the month of November. The key feature with respect to the upper air maps is the position of the PV - polar vortex. We have highlighted the PV in far north central Canada. Notice that the PV is oriented in a west to east alignment (similar to that of a football) . When the PV is situated this far to the north and is oriented in a west to east alignment it almost always means that all the cold air is locked up and central and northern Canada and it allows the Pacific jet stream to overrun the CONUS.

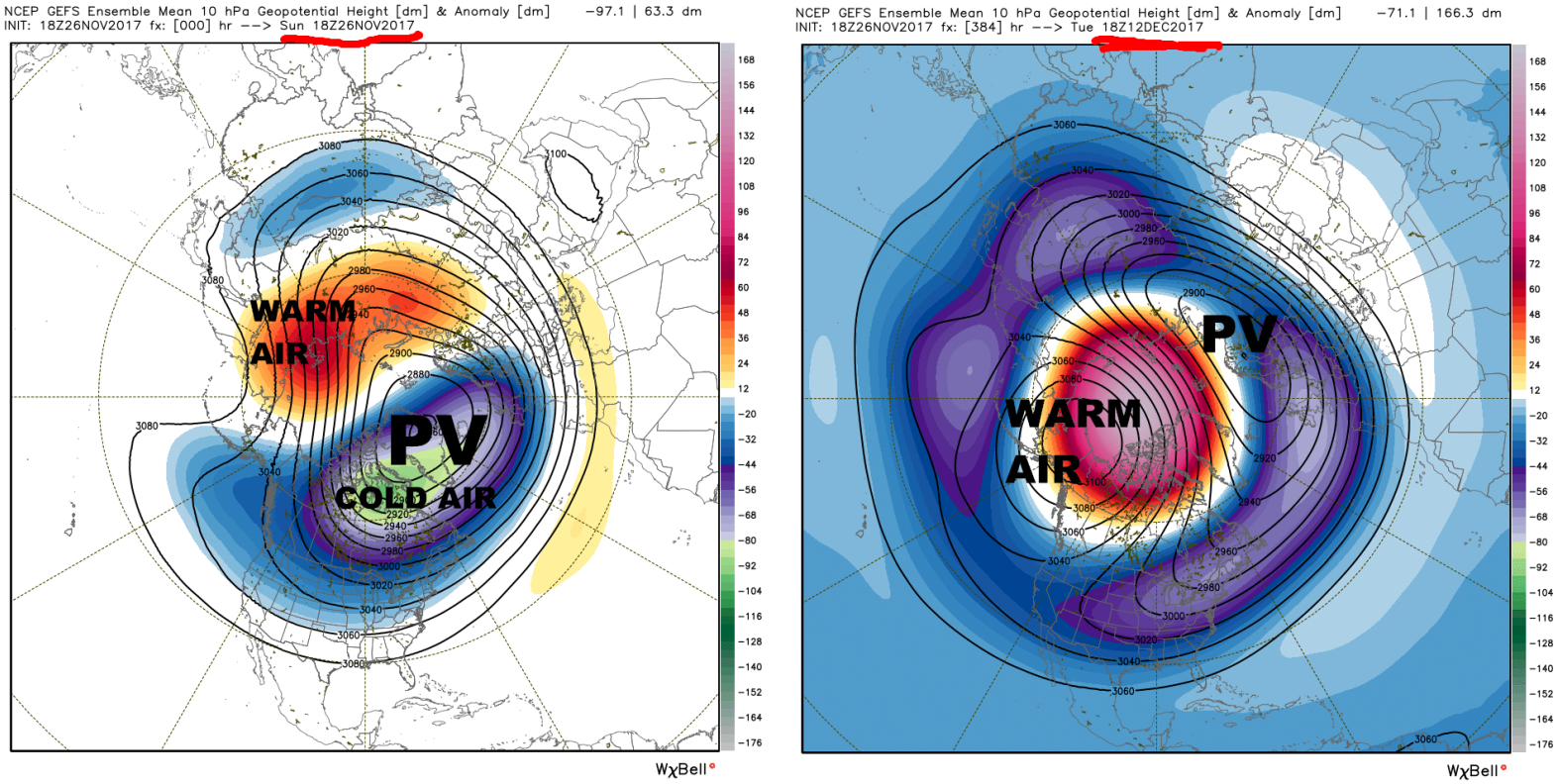
Indeed taking a look at the 500 mb height lines we can clearly see the overall pattern is essentially running from the central Pacific East across the entire CONUS into the western Atlantic Ocean.

Not surprisingly the temperature anomalies at the surface show Much Above Normal across the Southwestern states ...the Rockies ...a good portion of the Midwest and into south central Canada. Only the Deep South and East Coast areas see temperatures Near Normal over the next five days.





This next image is crucial understanding why the atmosphere is going to undergo a major spasm which will cause the pattern to shift dramatically over the entire northern hemisphere. This image shows the temperature anomalies relative to normal at ther very top of the atmosphere (almost by the edge of outer space) . he image on the LEFT is the actual map from Sunday afternoon and we have highlighted the key feature. The PV is located over northeastern Canada and Greenland and at this level the atmosphere represents the coldest air over the northern hemisphere. Whenever you see a large deep pool of extremely cold air like this at the very top of the atmosphere ...the PV is always in very close proximity to this pool of extremely cold air. In addition notice the pool of warm air -relative to normal- over Siberia which represents a strong blocking pattern at the mid levels of the atmosphere.



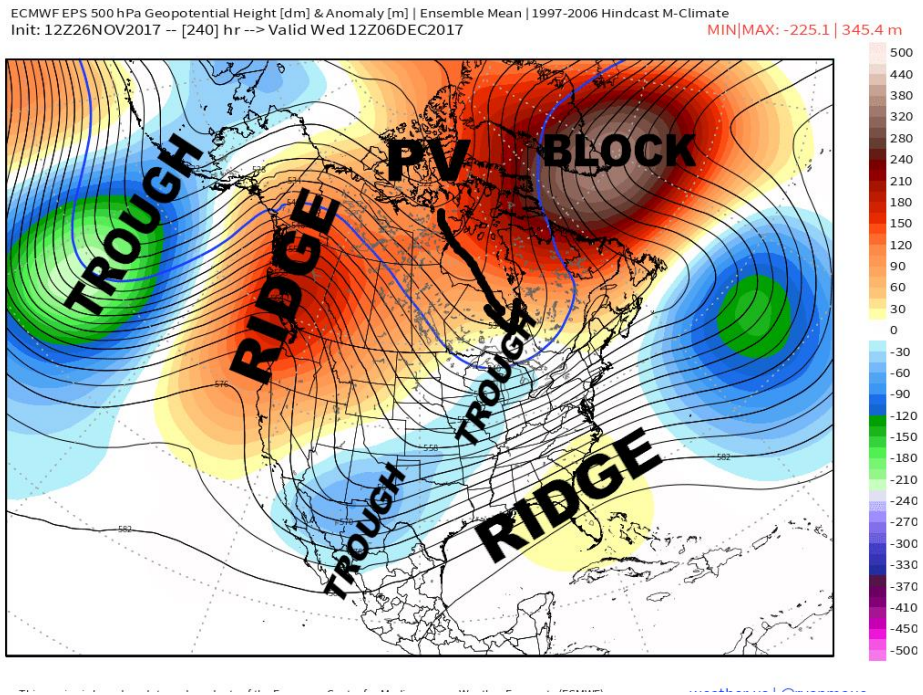
By day 14 we can clearly see massive changes have developed over northern hemisphere. The PV has a shifted from Greenland and northeastern Canada into northern Finland and far Northwest Russia. At the same time the bubble of mild air over Siberia has exploded into a massive pool of extremely warm air relative to normal and has moved shifted into Alaska northwest Canada and the entire arctic region. This represents a sudden stratospheric warming event which is going to cause a major change the pattern. It is this bubble of warm air which is going to allow the strong RIDGE over the West Coast North America to expand all the way up into the Arctic circle and establish a cross polar flow of Siberian arctic air that will get funneled into Canada and eventually into

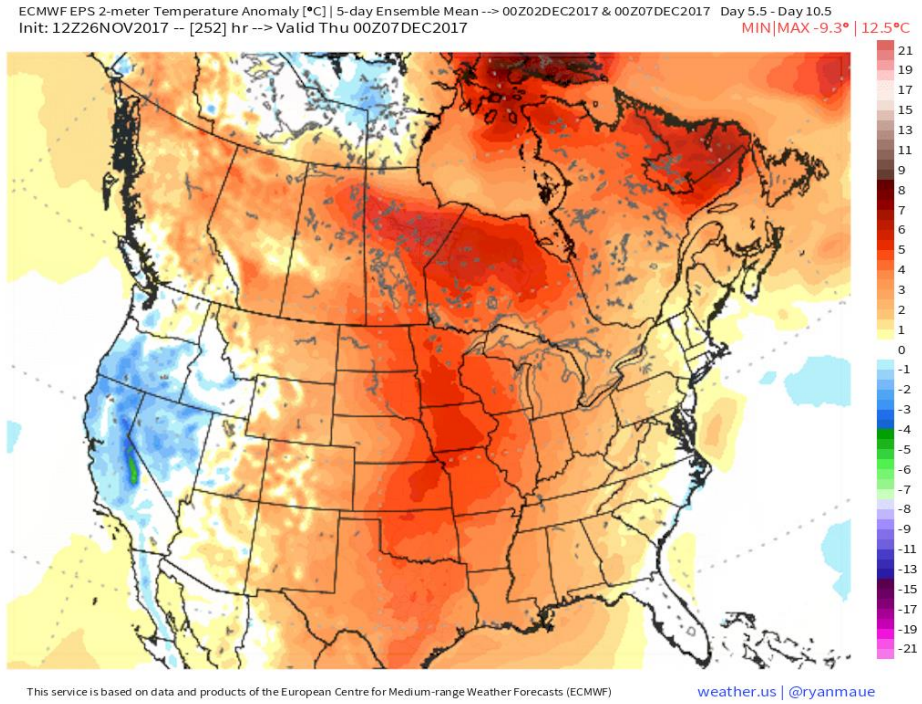
the U.S.. In addition this is also going to change the pattern over Greenland and eastern Canada as well as establish a deep winter like trough over the central and eastern U.S..

6-10 DAY

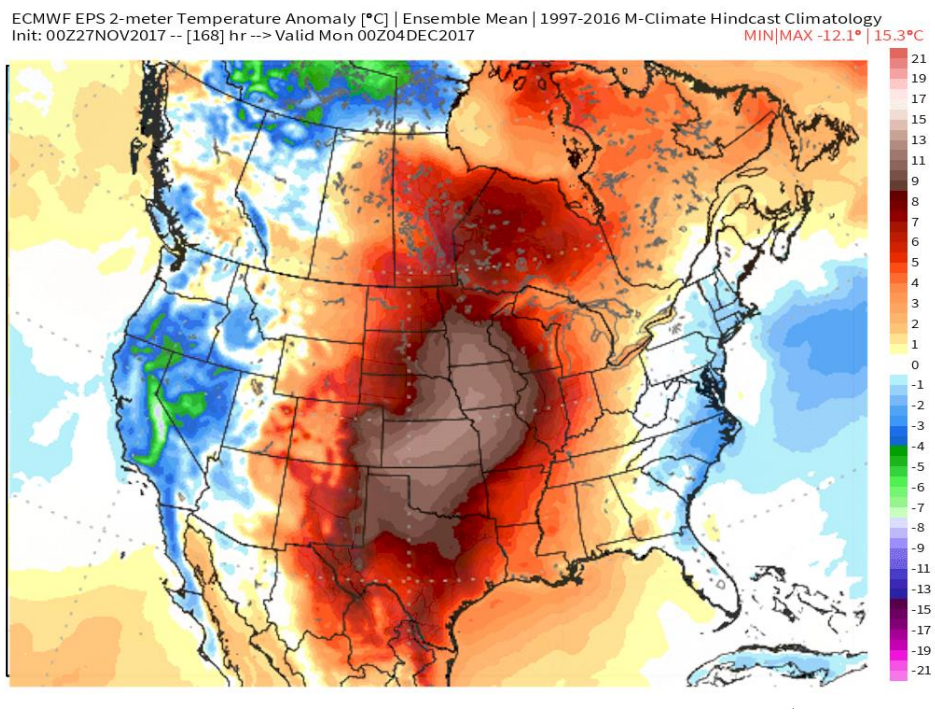
These changes begin to show up in the 6-10 DAY maps. The five day 500nb mean (image on left) shows major changes taking place here after December 3-4. Notice the development of a large ridge over the West coast of North America which forces the Polar Vortex to move from far north central Canada into southern Hudson's bay. The strong ridge over the Southeastern states gets suppressed into the Bahamas and a broad trough becomes established over the Midwest and the Great Lakes a with a secondary trough over the Southwestern states. Finally the positive height anomaly over Iceland begins to shift back into Greenland where becomes a classic Greenland blocking pattern (also known as the negative phase of the NAO).

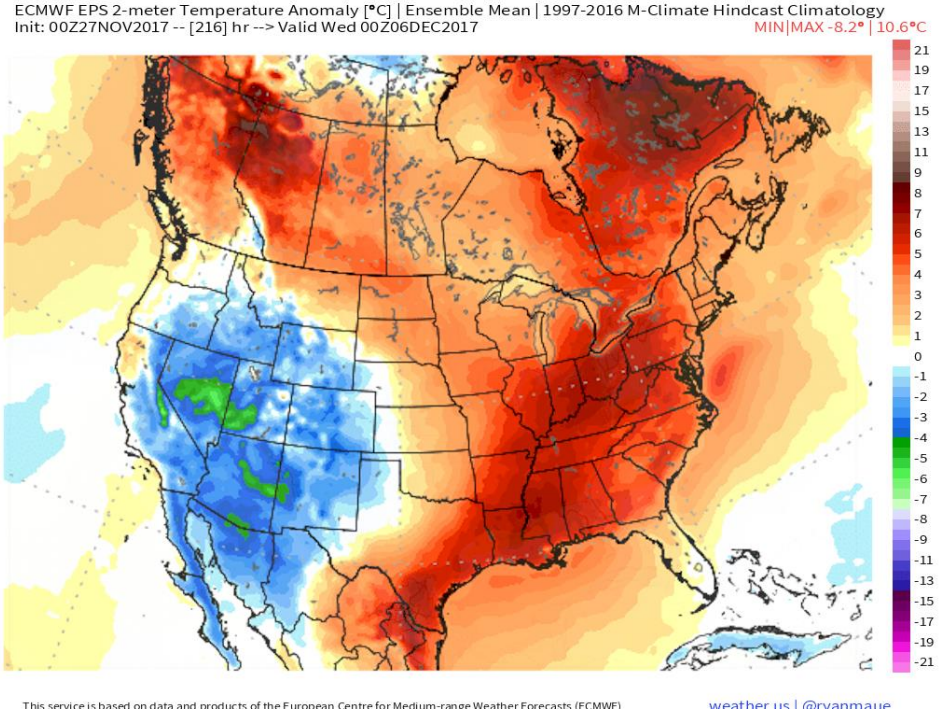
The surface temperature anomaly map (RIGHT) shows temperatures remained pretty warm over most of the Plains …the Midwest and the Lower Plains. But this is somewhat deceptive.





If we look at the temperature anomalies for D7 we can see extreme warmth over all of the Plains and the Midwest regions but temperatures still remain near normal over the East Coast and somewhat below normal over the West Coast. By D9 /December 5 the warm temperature anomalies have moved into the entire eastern half of the country.



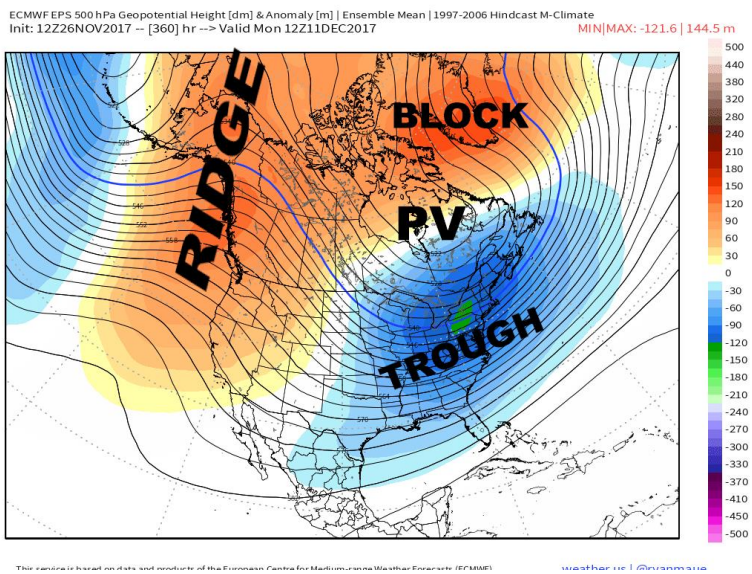


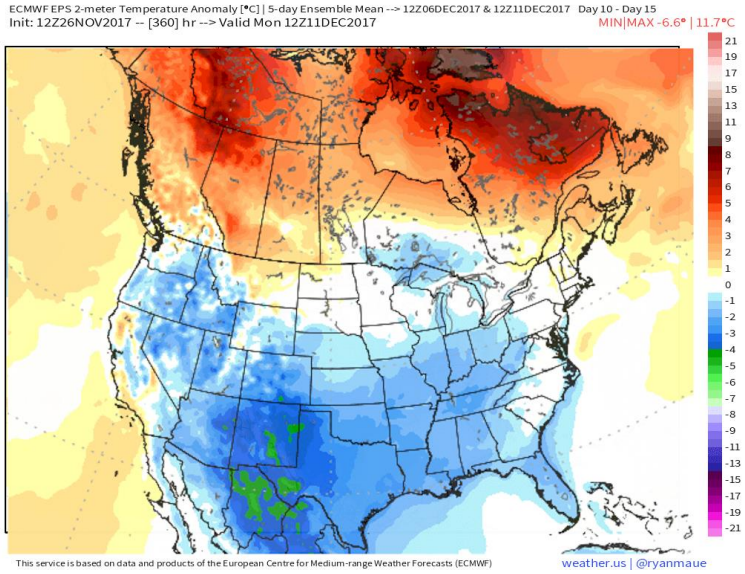
In other words even as the pattern begins to evolve a D8-10 it is going to take awhile for the cold air to get into the U.S.

11-15 DAY

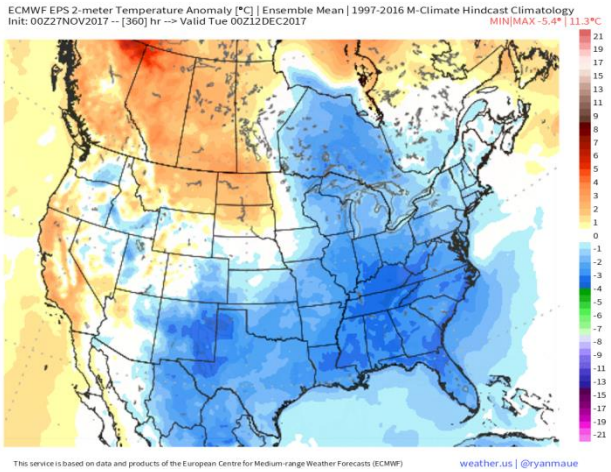
In the 11 to 15 day a full fledged arctic outbreak appears to be underway according to the upper air jet stream maps. The image on the LEFT shows a strong ridge on the West Coast of North America which extends up into Alaska and the entire Arctic region. This feature is known as the enhanced or strongly positive PNA pattern and when the ridge like this extends into Alaska the arctic region ...the EPO (Eastern Pacific Oscillation) become strongly negative as well. It is these establishment of these two features that sets up cross polar flow of arctic air from Siberia across the Arctic region into North America. In addition the PV is forced well to the south and appears to be setting up over the southern portion of a Tuesday or Quebec Canada. This would be a

significant development as invariably the arctic air invasions are almost always associated with a displaced PV. There is a strong blocking pattern over Greenland and of course the Arctic Oscillation has gone strongly negative as well.





Finally we can see a deep and persistent trough over the eastern third of country and there appears to be some sort a significant area of LOW pressure over the Deep South and/or the Tennessee Valley which could pose a threat of a winter storm sometime after December 10.



If we look at the five day temperature anomalies of the surface ... it does not appear to be all that cold over the Midwest or the East Coast. However if we look at the individual daily temperature anomalies we can see that by day 15 temperatures have turned significantly colder than normal over the eastern half the country.

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