This is a sample from fall of 2012:

## **Approaching Winter** - Will it be cold or mild with more or less snow?

Within the Tropics (23.5 degrees latitudes North and South), during the year, the Sun is only truly overhead at a particular place and time. Therefore, the Tropics are always subjected to greater heat input than anywhere else around the globe; hot Tropics. At the geographic Poles of the Earth, the Sun is entirely absent for a period within any mid-winter. Hence, due to lack of solar heat input the Poles are cold. This difference in temperature between the Tropics and the Poles creates an unstable situation that is constantly trying to correct itself to attain thermal equilibrium around the globe. In other words, the Tropical heat has to shift northward and the Polar cold southward to mix and become thermally equal. In this regard, the mass movement of these thermally different air masses is attained by ceaseless winds that circulate around alternating high and low pressure systems that surround the Globe.

These winds (mass motion of different air masses) occur in the horizontal as well as in the vertical, within a thin part of the Atmosphere called the Troposphere; on the average 11 KM thickness in the mid-latitudes – a very approximate current radius of the city of Calgary. Weather as we know it occurs within the Troposphere. Within the Troposphere, the winds rotating about the axis of the Earth, encounter varying degrees of topographical elevations. These geological obstacles within a wind flow alter the wind direction and speed of motion and therefore, are instrumental in helping to create their own pressure patterns; higher pressures on the wind ward sides of the land obstacle and lower pressures on the lee ward sides.
This basic pattern of General Circulation within the Troposphere is a Global weather steering flow mechanism. Wind (mass motion of air masses) moves heat, moisture, surface and upper-level pressure systems within this circulation, regardless of political boundaries. The Troposphere is also greatly influenced by the water bodies on the Earth. In this regard, the Troposphere and the condition of Earth's surface water are considered together as an Earth Troposphere System; one influences the other.

Many research Institutions, operate numerous dynamic and statistical numerical weather computer models that try to simulate aspects of this Earth Troposphere System. These models come with their strengths, weaknesses and biases. Some of the parameters under consideration are Sea Surface Temperatures, Sub-Surface Temperatures, Winds (low and high level), in-coming and out-going radiation, moisture in the air, convective cloud clusters, precipitation, pressure systems, etc. The research of a great number of these meteorological variables have an interest focused at and within a few degrees North and South of the Equator; an area of maximum solar heat input and water body heat retention. Since the bulk of the North American latitudes are under the influence of winds from the Western quadrants, close attention is directed at the up-stream Pacific Ocean and in this case, the Equatorial Pacific Ocean. The Troposphere interacting with the Eastern Equatorial Pacific Ocean will transport meteorological parameters/variables from there to our Canadian Prairies.

When various meteorological elements are in sync in the Eastern Equatorial Pacific, we can either end up with pooling (in the water and above) of heat in that area called an El Nino event or a cooling called a La Nina event.

To date this year, the observed meteorological conditions in the Eastern Equatorial Pacific are not conducive in supporting a full blown El Nino event. In other words, the Oceanic and Tropospheric conditions are not in sync to generate a pooling of warm/hot air in the Eastern Equatorial Pacific. Furthermore, the dynamic and statistical weather forecast models are not showing strong confidence in forecasting an El Nino event. At best the forecast is for a Neutral ENSO (El Nino Southern Oscillation) to a weak El Nino episode for the months leading to the end of 2012. Changes in the ocean and Troposphere conditions from a Neutral ENSO to a strong El Nino or La Nina event are slow.

This deduction is also supported by the Arctic Vortex Oscillation (a spiraling pool of Arctic air that extends from the Troposphere into the Stratosphere layer above). To date, there is no significant strengthening of its circulation. When the Arctic Vortex is strong, then comparatively mild winter temperatures grace the Canadian Prairies as is the case during El Nino episodes; both phenomenons working in tandem. A weak Arctic Vortex helps to usher in periods of very cold temperatures into the Canadian Prairies. Changes in the strength of the Arctic Vortex can be rapid.

In view of the above and to the end of 2012, in general, it can be concluded that parts of the Canadian Prairies will experience near normal temperature and precipitation regimes whilst other parts will have slightly elevated average values in these categories. An inherent characteristic of a warmer air mass is that it can hold more moisture in it than a colder air mass. Hence, due to the forecast temperatures being slightly elevated, the delivery of precipitation will also be slightly greater than normal. The precipitation totals could be the result of a series of cumulative precipitation events or a few single events. The temperature and precipitation normal values of sites across the Canadian Prairies are posted on Environment Canada website – Canadian Climate Normals.

Darr Maqbool & Associates offer consultation for additional weather forecast details that pertain to your area(s) of interest across the Canadian Prairies during the aforementioned time period.

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