

1 *Conference Proceedings Paper*

2 **Northern Hemisphere Flow Regime Transitions,**
 3 **Blocking, and the Onset of Spring in the Central USA**

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8 Received: 12 November 2020; Accepted: date; Published: date

9 **Abstract:** Studies have shown that maxima in the time series of Northern Hemisphere (NH)
 10 Integrated Enstrophy (IE) can be associated with large-scale flow regime transitions and often, the
 11 onset and decay of blocking events. Studies have also demonstrated that maxima of this quantity
 12 can be identified in ensemble model forecasts as much as 10 days in advance. During February and
 13 March 2019, strong IE maxima were associated with changes in the NH flow regimes that brought
 14 very cold conditions to the central part of the USA. These colder conditions also were associated
 15 with very strong Pacific and Atlantic Region blocking events. Using the NCEP re-analyses, three
 16 different teleconnection indexes, and surface temperature data from six different cities in the central
 17 USA, these IE maxima are identified. The maximum, minimum temperature and precipitation
 18 characteristics for these cities during the different large-scale flow regime characteristics are
 19 determined. The results will demonstrate that relatively warm conditions persisted through the first
 20 part of February before a period of anomalously colder (as much as 20° F below normal) and drier
 21 weather, with more snow, persisted into early March. This period was bookended by major changes
 22 in the NH IE time series and a strong simultaneous NH blocking episode. Following this period, the
 23 temperature regime returned to values that were closer to normal. Finally, these changes were
 24 anticipated well by an ensemble model.

25 **Keywords:** Blocking; teleconnections; integrated enstrophy; weather forecasting; flow regimes,
 26 climatology.

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