EAS372 Assignment 2 (10%) Due: 6 Mar., 2012

Format: Please submit a tidy, organized report covering the exercise below. Report should be single-sided, double spaced with font size 12 pt. The page limit is **three**, not counting figures.

Task: After a generally mild late fall and early winter, on 17 January 2012 the daily mean temperature at Edmonton International Airport (CYEG) fell below minus -30^{o}C (see `courses.eas.ualberta.ca/eas372/CYEG_Jan2012.pdf`).

- Referring to available synoptic charts, e.g. those archived on the course web site at `courses.eas.ualberta.ca/eas372/eas372_classicweathersituations.html` or maps generated at the NOMADS site `nomads.ncdc.noaa.gov/`, document this transition in Edmonton's weather from a meteorologist's perspective.

- Draw up a "cross-section" of the fields of temperature and potential temperature along a NW—SE oriented axis, using the 12Z soundings for 17 January 2012 at Fort Smith (ysm), The Pass (yqd), International Falls (inl), Green Bay (gnb) and Wilmington (inl). The sounding data and a blank cross-section can be obtained off the course web site. Plot T contours for $T = (-40, -30, -20, -10, 0^{o}\text{C})$ and plot θ contours for $\theta = (250, 260, 270, 280, 290, 300\text{K})$. Note that you will need to compute potential temperatures for each of your soundings (use reference pressure $p_0 = 1000$ hPa). You will *interpolate* to find the needed heights of the specified T or θ surfaces at each sounding. Briefly comment on the thermal structure that your cross-section reveals.

- Use the hysplit model[1] (`http://ready.arl.noaa.gov/HYSPLIT_traj.php`) to compute backward-in-time trajectories starting at ground level at Edmonton (latitude 53.5, longitude -113.5). Compute backward paths of 72 hour duration from 12Z start times on January 14, 15, 16, 17 and 23. Base your trajectories on GDAS meteorological fields (gdas1.jan12.w3, and gdas1.jan12.w3 for the run ending Jan 23). Briefly interpret your trajectories relative to the weather transition under discussion.

[1] and/or the Japanese CGER system: `http://db.cger.nies.go.jp/metex/trajectory.html`

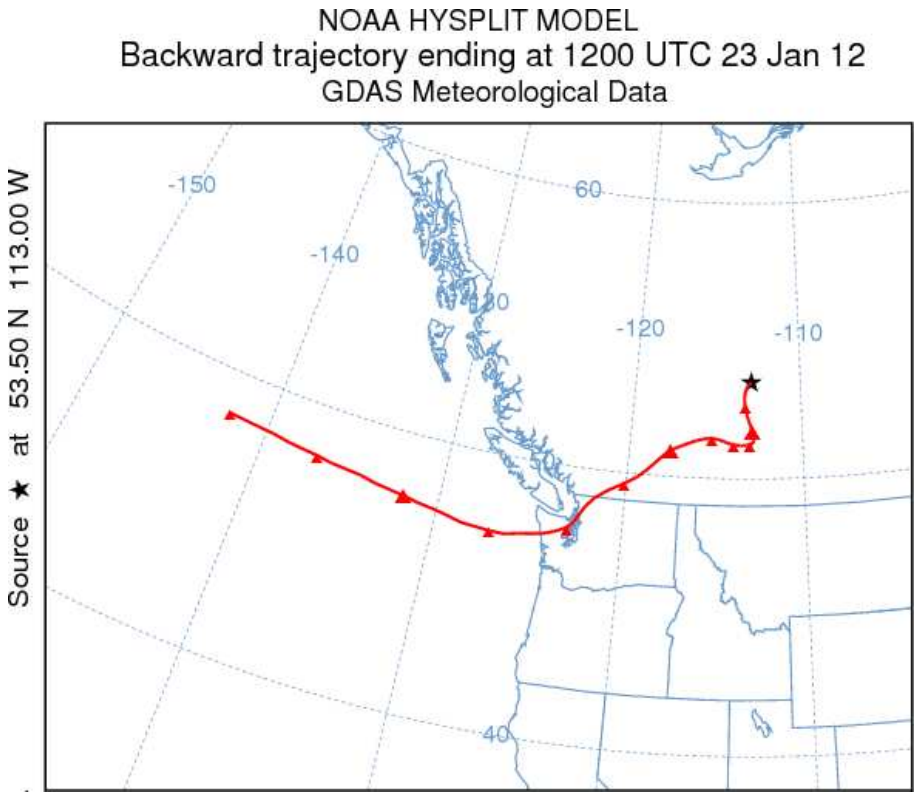

Figure 1: Back trajectory ending ground level in Edmonton on 23 Jan. 2012 at 12Z.