Many introductory meteorology courses make brief mention of the effects of solar particles, space weather and aurora in an overview lesson. Often this is the only time undergraduates hear of such effects. Because of the potentially large impacts of extreme solar events on our technology-driven society we are re-introducing this topic in a three-lesson sequence near the end of our semester-long courses.

Of course one of the challenges in doing this is simply making room in the syllabus for an additional chapter of material. Another challenge is finding the background material to support such lessons, since popular introductory texts often provide only a page or two of background and most space physics texts, assuming an audience with advanced mathematics and physics backgrounds, are too technical for most introductory meteorology students. A third challenge is associated with introducing the concepts of electromagnetics and plasmas to students whose physical science background usually consists of introductory mechanics at best. Finally, it is challenging to test the students at an appropriate level.

This paper primarily deals with the second issue of finding and sequencing background material for the Sun-Earth segment of our courses. It also provides ideas regarding the introduction of plasmas. We have developed material for the following three lessons:

1) Sun-Earth Connections: Evidence for and Impacts of Space Processes
2) Major Space Weather Threats: What Happens During a Space Weather Storm?
3) Space Weather Observations and Forecasts

Lesson one typically deals with defining space weather and its sources and "touring" the regions of the Sun and the near-earth space environment. It provides some qualitative/intuitive description of the major physical processes in each of the regions. This lesson also addresses the concepts of a plasma and the geomagnetic field. Finally we introduce the ideas of a space weather storms and compare some features of space and terrestrial weather. The Windows of the Universe space weather website offers useful background material for this lesson: http://www.windows.ucar.edu/spaceweather

Lesson two addresses three major space weather threats: disturbances in the geomagnetic field, disturbances in the ionospheric electron density, and enhanced radiation dose. Brief physical/intuitive descriptions of each of the three threats are given, and the impacts of these threats on satellites and astronauts, degradation of communication and navigation, and on power transmission systems are described. As in terrestrial weather, where mid-latitude cyclones develop apart from hurricanes, geomagnetic disturbances can occur as a distinct

form of disturbance from a radiation or communications storm. We address the timing and associations between these types of disturbances. Finally, we introduce the space weather index for each of the three threats. We have found good supporting material for this lesson at The Space Environment Center's Website at http://www.sec.noaa.gov/Education/

In lesson three we introduce the types of observations that are important to specification and forecasts of space weather. Most students are completely unaware that GOES and POES satellites, whose data appear so often in the terrestrial weather regime, also carry a compliment of space-environmental sensors. We discuss these instruments as well as the unique solar monitors in orbit around the earth and on the earth. We also discuss the blend of empirical and numerical models currently used for space weather analysis and forecasting. We also introduce the ongoing national and international space weather programs so that students who are interested in space weather may start planning their career development.

Introducing space weather is a significant challenge in an introductory meteorology course, however the growing reliance on technology susceptible to space weather disturbances makes this an important new component of the atmospheric sciences.