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The Integration of AMS' Online Weather Studies into the Undergraduate Curriculum

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In the fall of 2002 AMS' Online Weather Studies was substituted as the main mode of delivery for Alaska Pacific University's 300-level meteorology course: *Meteorology: Weather and Climate*. This course was traditionally offered on a 2-year cycle in the spring semester alternating with a 300-level course in oceanography. The use of AMS' Online Weather Studies offered several curricular advantages. Foremost among these was giving students the opportunity to enroll in APU's meteorology course each semester. The former format, in which the course was offered only once every two years, precluded many students from enrolling due to scheduling difficulties. Because the course was offered at the 300-level within the Environmental Science Department, it was targeted for science majors and not taught as a general university laboratory course available to first-year students. Within the last year, a 100-level version of the course entitled *Introduction to Meteorology* has been formally approved and will be offered during the Spring Semester, 2004. This paper will outline how Online Weather Studies has been adapted to serve several different student populations.

Alaska Pacific University is a small liberal arts institution located in Anchorage, Alaska. Enrollment is approximately 600 FTE, with approximately 20% of these students majoring in environmental science. The environmental science degree has several tracks. These include biology, earth science, marine biology, and environmental policy. *Meteorology: Weather and Climate* is an upper division course that typically has an enrollment of approximately ten students every two years. In order to offer the course at the 300-level and make

it more meaningful to environmental science majors, a significant project was required. Students were required to apply meteorological data to a practical problem. An additional benefit garnered from Online Weather Studies was the incorporation of Internet weather and climate data in other courses. In this manner, Online Weather Studies has a far greater impact on the environmental science curriculum than its existence as an isolated upper division course. Examples of how Online Weather Studies was used for projects within the Meteorology course as well as expanded into other areas include:

- Examining the relationship between meteorological conditions and air pollution. Anchorage is listed as non-attainment area for carbon monoxide and the city also has a problem with particulates. Students examine the relationship between CO, particulate concentrations and weather data.
- Students completing the meteorological portions of a water management plan for a National Park. The latter can be modeled after work the instructor recently performed for Katmai National Park, Alaska.
- Temperature profiling in a forest. A student used HOBO temperature sensors placed on trees to look at the temperature profile from the floor to the canopy in forested areas to examine microclimate in a winter ecology course
- The use of climate data to teach basic statistical concepts and examine the hypothesized global warming phenomenon in different locales in the United States. Lesson was developed for use in the instructor's environmental chemistry and basic statistics courses.

Because the 300-level course *Meteorology: Weather and Climate* already existed in the environmental science curriculum at APU, the integration of Online

Weather Studies into this course was easily achieved. In the past year, Online Weather was used as the basis of a trial first-year Introduction to Meteorology course at APU. This was significant because it filled a need to provide a general laboratory science requirement to several non-traditional student populations who had limited access to the campus. The main group of students who benefited from the trial first-year course was Alaskan Natives who lived in rural Alaska and were students in APU's RANA (Rural Alaska Native Adult Program). These students attend class for one week at the beginning of the semester on APU's campus and then complete courses in their local communities. Students enrolled in this program are scattered across the state and communicate with the instructor via email and telephone. The Meteorology course for RANA has student in Barrow, Unakaleet, and small villages. Several students in this course were able to seek help from their local NWS offices. The success of this trial course ultimately prompted the insrtuctor to seek and gain formal approval of *Introduction to Meteorology* as a regular course to be included in the Catalog.

In Spring 2004, another group that will benefit will be students in APU's Degree Completion Program (DCP). These students are adult learners who attend class one day a week, and complete most of their class work at home. Students will attend the *Introduction to Meteorology* class on Saturday mornings where they will review the week's lessons, be evaluated, and be introduced to the upcoming week's material. Additionally, this course will also be available to any APU student. An added benefit of this course will be to bring together traditional and non-traditional student groups. These groups generally have little interaction on campus.

Another use of Online Weather has been as a springboard for college students in education to use with younger students in schools. For example, during the spring and summer of 2003 a student enrolled in APU's

Meteorology and Climate course, which was based on Online Weather Studies, used content from the course to develop weather activities for youth. These activities included establishing a weather station at a Youth Center and recording daily weather (temperature including 24-hour high and low and precipitation) throughout the summer. Student data were compared to data collected at APU's NWS Cooperative Station by graphing and simple statistical analysis using SPSS. Additionally, the students assisted in designing and building a simple anemometer. Data from the anemometer were plotted into a wind rose using an online computer program (http://www.WINDPOWER.org). Activities were supplemented with field trips to a television newsroom during the weather broadcast and Elemendorf Air Force Base's 3rd Wing Weather Flight Station. Activities demonstrate how Online Weather can be used by education majors and other students who work with youth groups to use weather as a basis for science education.

In conclusion, the incorporation of Online Weather Studies into two different courses at APU has expanded the availability of science education to several different student groups:

- Upper level environmental science majors who must incorporate the material into a significant science project
- Traditional students who are non-science majors who use the course as a general university laboratory science requirement
- Adult Native students who fulfill their laboratory science requirement in their local communities and villages
- Degree Completion Students in the business program who are working adults attending class one day per week. These students also use the course to fulfill their general laboratory science requirement.