

CONNECTING STUDENTS TO METEORITE RECOVERY AND RESEARCH.

Andrew Caldwell, ANSMET, Matthew Foos, Douglas County High School, Castle Rock, Colorado 80104 (Caldwell@tea.rice.edu)

Introduction: Through the use of technology and innovative activities, great opportunities are possible for connecting classrooms with authentic research. Students seem to have a natural curiosity and enthusiasm for meteorites. Through the Teachers Experiencing the Arctic and Antarctic Program (TEA) and the Antarctic Search for Meteorites (ANSMET), students at Douglas County High School (DCHS) have been able to be connected to meteorite recovery efforts in the field. They have also been able to gain first hand knowledge of current research being conducted on meteorites. In addition to this, students at DCHS have had opportunities to participate in field searches and in the implementation of a digital camera network that endeavors to track bolide events in Colorado through the Denver Museum of Nature and Science (DMNS).

TEA (<http://tea.rice.edu/>) is a program sponsored by the Elementary, Secondary and Informal Education branch of the National Science Foundation. It is coordinated through the American Museum of Natural History, Rice University, and the Cold Regions Research and Engineering Laboratory in Hanover, New Hampshire. Its goal is to connect classroom teachers to polar research both in Arctic regions and in Antarctica. About a dozen teachers are chosen annually to participate. Their experiences range from working aboard icebreakers measuring sea floor spreading off the Antarctic coast to participating in an archeological dig in an Inuit village in Alaska. The teacher's classroom is able to keep up with the research through a website and web casts sponsored through TEA. Anybody with Internet access can follow the teacher's field experience. The teacher is also responsible for helping other teachers to implement polar research in their curriculum and to transfer this research experience to their community.

ANSMET (<http://www.cwru.edu/affil/ansmet/>) has taken a TEA teacher to Antarctica the last two field seasons. ANSMET has been actively collecting meteorites from Antarctica since 1976. The Antarctic Ice Sheet acts like a conveyor belt and concentrates meteorites in locations where the ice is "pushed up" and ablated by the katabatic winds. Meteorites are exposed in these regions

and are collected by field teams for subsequent research. ANSMET's willingness to take a teacher to the field has allowed students to gain a first hand perspective on the research efforts of the team and be a part of the search.

Activities: Students at DCHS have been directly or indirectly participating in meteorite research for several years. The DMNS sponsors a meteorite research team that mostly consists of volunteers who track witnessed falls and identify possible meteorite finds. In recent years, several bolide events have occurred over Colorado prompting hundreds of people to call the museum with witnessed accounts. Students at DCHS have been involved in evaluating these accounts for accuracy and reliability and have



plotted several of these events

The success of the meteorite recovery team has led the DMNS to establish the All-Sky Camera Network

(http://dmns.org/space/prg_allsky.html), a network of 12 digital cameras mounted on the rooftops of schools strategically placed throughout Colorado. Mounted above a convex mirror, the camera is connected to a frame grabber card on a dedicated computer. The frame grabber saves images of any type of moving light across the sky.

The All-Sky program is a great project for students to get involved with in for many reasons. It gets students involved with meaningful research. Not often enough do students get the opportunity to step away from textbooks and into the field for some real science. Working in conjunction with teachers and program directors, students can help in plotting possible meteorite falls and analyze

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events such as meteor showers. This is also a good experience for students because it gives them an idea of what a career in the sciences may be like, possibly sparking interest in such aspirations. The All Sky program is most certainly a unique program in Colorado.

The process used to locate meteorites not only incorporates knowledge of the nature of bolide events, but also requires some basic geometric skills. A source for activities that teach these skills is the NASA publication, *Exploring Meteorite Mysteries* [1]. It is a resource that contains several meteorite related activities that are standards based and useful in several content areas. Some of the more useful activities include one that teaches students how to plot the direction and speed of a meteor; one that teaches meteorite identification through comparison to candy bars; and one that allows the students to design their own Antarctic meteorite recovery team.

Conclusion: Through programs like TEA and ANSMET, it is possible to get students directly involved with meteorite research. Innovative research opportunities like those offered by the DMNS let students take ownership in the research and make a significant contribution to meteorite recovery efforts. Students are a great resource and have almost unlimited enthusiasm when it comes to authentic research.

Reference: [1] Lindstrom, M.M., et al (1997) *Exploring Meteorite Mysteries*, NASA JSC.