

2026-2027 Twinning Program Projects

PROJECT: Subduction zones in the 21st century, from the field to the classroom

Project Director:

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Project Summary:

Students learn best when they are able to get hands-on with real world data and problems. Subduction zones are an excellent sandbox to explore everything from structural geology and metamorphic petrology to igneous processes to geophysical data, but many classrooms do not have easy access to the rocks or data that can be collected from modern subduction zones or exhumed subduction-related rocks. Research into exhumed subduction complexes is producing cutting-edge structural, geochemical, geochronologic, geophysical, seismic, and rheologic data that we want to make accessible so that faculty can bring subduction zones into their classroom regardless of where they are located and the resources they have. Virtual Field Experiences (VFEs), including static imagery, videos, maps, drone imagery, 3D models of outcrops and rocks, and field data allow students to experience field research even when getting out in the field is not possible due to location, funding, or accessibility concerns. In addition to VFEs, published data for exhumed subduction complexes provides opportunities to explore and interpret genuine research data from a wide range of fields. Activities investigating subduction zones can be incorporated into many different courses to give students experience with different datasets. Active learning like this improves student retention of course materials and increases student success across a wide range of student backgrounds.

For this project, we plan to leverage published data collected by our research groups in exhumed subduction complexes around the world to create a Virtual Field Experience and a suite of associated activities that could be adapted and adopted into upper-level undergraduate or graduate-level courses at any institution. We will specifically focus on designing several different options (e.g., field-focused vs. lab-focused) and at several different levels (e.g., undergrad vs. grad) to make these as widely usable as possible. We will share these on the Teach the Earth website as a part of the Science Education Resource Center (SERC).

Role and probable activities for a student researcher in this project:

This project is a chance to learn how to teach effectively. Virtual field trips and hands-on project-based classroom activities are important themes in effective and equitable teaching, and this experience will be invaluable to a student who is interested in teaching students at any level in the future. To develop these activities, the student will draw on several decades of education research to learn about best practices and will learn about subduction processes and the data available from our research groups and beyond. Based on what we have available, the student will storyboard and design a virtual field experience and associated data analysis activities. During the spring, the student will revise the activity outlines and start to build out instructions and related materials. This project will also involve field work during the summer to collect imagery and structural data in an exhumed subduction complex that the student will use for the virtual field trip. The final activity for the student will be to post the VFE and data processing exercises to Teach the Earth so that they are publicly available and to share their resources at a national geoscience meeting like GSA or AGU.

Preferred Skills

Experience with ArcGIS and/or experience as a teaching assistant is preferred but not required. We will provide training through our regular meetings, online resources and classes in our institutions for students who do not have these backgrounds.