

README for Supplement to Virtual mapping and analytical data integration: A teaching module using Precambrian crystalline basement in Colorado's Front Range (USA)

Kevin H. Mahan¹, Michael G. Frothingham¹, and Ellen Alexander¹

¹Department of Geological Sciences, University of Colorado Boulder, 2200 Colorado Ave., Boulder, Colorado 80309

Correspondence: Kevin H. Mahan (kevin.mahan@colorado.edu)

Appendix A: Description of Materials

A1 Part I: Mapping

Station Descriptions and Data *GGstationdescriptions.zip* The zipped folder contains station descriptions and data (e.g., lithology, outcrop and structural descriptions, photos, sketches, and strike/dip and/or trend/plunge measurements). Some stations do not contain all of these components. Each file is a Word document (.docx). Higher resolution versions of any of the photos are available upon request from Mahan.

Google Earth Web "Golden Gate Mapping Project" [Google Earth Web](#) This project includes the field station locations as well as 9 View points containing general photo perspectives of the field area. Click on the View points in the listing on the left, and the screen will zoom to the 3-D perspective from which the photo was taken. Alternatively, one can save a KML file of this same project from within GEW, which can be viewed in Google Earth Pro, although the photos at the View points will not be available. There is a trail system in the field area but they are not marked in Google Earth Web at the time of this writing. However, they are available with the topographic basemap provided in StraboSpot (Fig. ??)

Station Locations Shapefile *GGstationlocations.zip* The zipped Shapefile contains all 110 station locations that can be uploaded to StraboSpot. Use this to pre-populate the 110 station locations as Spots (the file contains locations only). Students can then add data to the spots, and turn off the display of the ones that they do not use.

Instructions for StraboSpot *InstructionsStraboSpot.docx* Word document listing step-by-step instructions for getting started with StraboSpot, including how to load the above Shapefile, and some tips for setting up and conducting the mapping project in Strabo.

Station Description Request Form *StationRequestForm.docx* A blank station description request form as a Word document - students (or pair of students as mapping partners) fill out this form in order to justify their strategy for the next day's mapping.

Basemap Template *GGBasemap.pptx* Basemap template in PowerPoint for optional construction of final map. The working geologic map is built in StraboSpot, and with some effort a final map can be made to look quite nice and can be screen-captured for grading. However, this file is provided if a more polished final map is desired.

Map unit Introductory Slides *IntroGGmapunits.pptx* Powerpoint file with several slides that can optionally be used to introduce the rock types in the map area.

Assessment form *Preassessment.docx* A pre-course assessment form for self-reported data as a Word document. This can be tailored to specific teaching and learning interests, and it can also be modified for use as a paired post-course assessment.

Summary for Instructors *GGmapsstereonetsummaries.pdf* A pdf document for instructors with screenshots of draft geologic maps (several versions showing different Spot datasets) made from all stations, and summary stereonet of the basic structural components.

A2 Part II: Analytical Datasets

Introduction to Part II: *Introductionanalyticaldatasets.docx* is a word document with brief description of 6 optional datasets, to aid students in the choice of dataset with which they will work. *Introanalyticaldatasets.pptx* is a set of Powerpoint slides that can be used for the same purpose.

Dataset1: *Dataset1AdvancedStructure.docx* Document to be provided to students (or small groups of students) after they have made their choice. This document provides full references for data, a list of goals, recommended figures to create, and a list of specific questions or topics to address in the final report and presentation. *GoldenGatefielddata.xlsx* An excel file with the same text for each station that is found in the individual station descriptions, and the structural measurements. This is provided for use as the advanced field structural dataset, and it can be used to generate subsets of data for exporting to stereonet construction software.

Dataset2: *Dataset2Microstructure.docx* Document to be provided to students (or small groups of students) after they have made their choice. This document provides full references for data, a list of goals, recommended figures to create, and a list of specific questions or topics to address in the final report and presentation. *Wardetal2012ISRq.ctf* A Channel Text File for sample ISR-q from Ward et al. (2012), which was collected at station GG2 in this module. This can be used in MTEX (Bachmann et al., 2010) or in Oxford Instruments' Channel 5 suite of software to explore EBSD data, including generating a quartz c-axis pole figure. The thin section from which the EBSD data was collected was prepared such that the viewer is facing NE and looking at the plane perpendicular to the mylonitic foliation and parallel to the stretching lineation. The resulting quartz c-axis girdle is asymmetric and indicative of NW-side-up sense of shear.

Dataset3: *Dataset3MetamorphicPetrology.docx* Document to be provided to students (or small groups of students) after they have made their choice. This document provides full references for data, a list of goals, recommended figures to create, and a list of specific questions or topics to address in the final report and presentation.

Dataset4: *Dataset4MetamorphicMonazite.docx* Document to be provided to students (or small groups of students) after they have made their choice. This document provides full references for data, a list of goals, recommended figures to create, and a list of specific questions or topics to address in the final report and presentation. *McCoy01mnzISRsz.xlsx* An excel spreadsheet of raw U-Th-totalPb and Y data from the Idaho Springs-Ralston shear zone from McCoy (2001).

Dataset5: *Dataset5IgneousZircon.docx* Document to be provided to students (or small groups of students) after they have made their choice. This document provides full references for data, a list of goals, recommended figures to create, and a

list of specific questions or topics to address in the final report and presentation. *PremoandFanning2000data.xlsx* An excel spreadsheet of U-Pb SHRIMP igneous zircon data for the Boulder Creek Granodiorite from Premo and Fanning (2000).

- 60 **Dataset6:** *Dataset6DetritalZircon.docx* Document to be provided to students (or small groups of students) after they have made their choice. This document provides full references for data, a list of goals, recommended figures to create, and a list of specific questions or topics to address in the final report and presentation. *JonesThrane12Appendix1DZdata.xlsx* Excel spreadsheet of U-Pb LA-ICPMS detrital zircon data of quartzite from Jones and Thrane (2012).

- Geochronology Review:** *U-Th-Pb Basics.pdf* An introductory handout describing the basics of radioactive decay, U-Pb decay chains, the age equation, and analytical methods for U-Pb zircon analysis and U-Th-Pb_{Total} analysis of monazite.

U-Pb concordia spreadsheet: *Concordiadiagram.xlsx* is an Excel spreadsheet formatted for plotting U-Pb data on a concordia diagram. It is not formatted to include error ellipses. Students can copy select data from a source file and make new concordia diagrams with this spreadsheet.

A3 Part III: Reports

- 70 **Written and Oral Reports:** *Intructionsforfinalreport.docx* A Word document providing detailed recommendations for the organization and what to include in the draft and final written reports and a possible grading rubric.

References

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