2015 Summary

The objectives of this unit will be addressed through a series of exercises to be completed using Proterozoic rocks of the Amadeus Basin and Arunta Block in central Australia. Trekset Tours have been contracted to supply transport, camping equipment and all food for a 12 day tour. All accommodation will involve camping. You will depart Sydney on Sunday 12th July, and return on Thursday 23rd July. Return group air travel has already been booked; early arrangement of this was essential because of the size of the group and it will not be possible for individuals to customise their bookings.

Key Learning Objectives

The six main objectives in this unit are to:

• Learn basic mapping techniques (form surface mapping and structural mapping) in poly-deformed terrains straddling part of a major unconformity between a metamorphic basement, and a covering meta-sedimentary sequence
• Be able to recognise a range of lithologies, structures, and microstructures, in a range of metamorphic conditions
• Understand the styles and geometry of deformation phases, and to determine the sequence of deformation events that have affected the area
• Understand the nature of a variety of unconformities, and to correlate structures across them
• Develop a geological and tectonic history of a multiply deformed and metamorphosed area
• Most importantly, to recognize and solve geological problems in the field

Cost

Each student will need to pay $1480.00 to cover living and accommodation expenses on the excursion; there need be no additional cost to individual students. This fee will need to be paid before April 20 to match advance purchase arrangements for air travel, and to finalise numbers and logistic detail. The cost will then rise to $1550 for payment before April 27, and $1650 for payment before May 14. Travel costing and availability after May 14 will be assessed on a case-by-case basis. We are mindful that the cost is a burden to some students. However, the attendance of each student on this excursion presents a substantial cost to each School beyond individual contributions. Students that perceive they may have problems meeting this commitment can confidentially communicate with Geoff to resolve the issue.

Payment at: https://sydney.onestopsecure.com/OneStopWeb/aspx/tranform.aspx?TRAN-TYPE=1001 Please ensure that you retain a receipt of the payment.

Assessment

Students should be aware of the assumed knowledge (below) and that the educational objectives of the excursion involve concentrated learning. Prior excursions have involved substantial evening work by all students. Coursework requirements will be met in two compulsory one-day workshops on June 25 and June 26 and the field excursion. Due to the nature of the exercises, there are no alternatives to attending the excursion and workshops, and students must attend and satisfactorily complete all components of the unit to pass. The two workshops will involve a series of exercises that must be completed during the workshops, and related take home exercises. The excursion will involve four multi-day exercises that must be completed during the excursion (detail below).

• Upon your arrival in central Australia, you will need to be involved in risk assessment and be assessed on background reading of five or six key papers through the first exercise. Details of these will be distributed late in semester one.
• Multi-day mapping exercises on the excursion will be completed at Ross River in the eastern MacDonnell Ranges (150 km west of Alice Springs) and a second at Mt Boothby in the south-eastern Reynolds Range (150 km north of Alice Springs). Your work will be assessed from the perspectives of accuracy and the sophistication of geological interpretation, based on 2D surface mapping and 3D projections via, for example, cross section and block diagram presentation.
• During the excursion you will need to demonstrate skill in geological observation and interpretation from a range of aspects (see marking matrix below) and a satisfactory result is required in all assessment components to pass the unit.
Teaching Staff:
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Tim Chapman  t.chapman@sydney.edu.au
and others to be advised

Assumed knowledge
This unit relies heavily on the field techniques of mapping, stratigraphic correlation, and structural synthesis taught in the relevant prerequisite units. Basic principles such as form line mapping are still the backbone of most mapping, even in the highest-grade metamorphic rocks. This unit assumes that students are proficient at:
- navigating in the field using aerial photographs and GPS;
- the identification of common rock types, including distinguishing between common igneous, sedimentary and metamorphic rocks;
- aerial photograph interpretation using mirror stereoscopes;
- the use of geological compass/clinometers for obtaining field structural data (both planes and lines);
- methods of plotting structural data on maps and in stereographic projections;
- the stereographic analysis of folds;
- the preparation of basic field maps and, from them, interpretative well-constrained cross-sections and block diagrams.

Anticipated Itinerary

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
<th>Assessment due</th>
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<tbody>
<tr>
<td>June 25</td>
<td>pre-departure workshop</td>
<td></td>
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<tr>
<td>June 26</td>
<td>pre-departure workshop</td>
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<tr>
<td>July 12</td>
<td>08:30 Group to assemble at Qantas Group Check in for the flight to Alice Springs. QF790 Departs Sydney 09:55 arrives 12:50. Travel to Ross River Resort in the eastern MacDonnell Ranges. Lunch is at own expense on this day, and you will need to complete an exercise that will draw on the assigned reading</td>
<td>June 25 exercises (due on day); take-home exercise (due 9:00 next day) 2.5% June 26 exercises (due on day); take-home exercise (due 9:00 next day) 2.5% July 12 18:00: Risk assesment ex. 3%</td>
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<tr>
<td>July 13–17</td>
<td>Complete exercises and mapping in the Ross River area.</td>
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<tr>
<td>July 17</td>
<td>Transit from Ross River to Aileron Hotel and Roadhouse north of Alice Springs.</td>
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<tr>
<td>July 18–22</td>
<td>Complete exercises and mapping at Mt Boothby in SE Reynolds Ranges.</td>
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<tr>
<td>July 23</td>
<td>Pack-up and travel to Alice Springs airport. Return to Sydney QF791 Departs 13:30 arrives Sydney 16:45</td>
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Assessment due
July 13 21:00  N’Dhala Gorge ex  15%  July 16 21:00  Trephina Gorge ex.  30%  July 17 21:00  Basement Cover ex.  12%  July 21 21:00 Structural analysis  11%  July 22 22:00 Geological map cartoon  24%

Equipment
Trekset will supply three-man pyramid-style tents, with two persons allocated to each tent. They will also supply sleeping mats for the entire group, so there is no need to bring a lilo. You will need to bring all your geology gear plus sufficient robust clothing (for hot days and cold nights) for 12 days, together the usual camping gear: sleeping bag, pillow, sleeping sheet, eating utensils and a tea towel, toilet requisites, sunglasses hats and a torch. A more comprehensive list will be provided later.

Special Dietary Requirements
You must inform Geoff of any special dietary requirements well before the excursion so that appropriate arrangements can be made. Once the trip starts, there will be very limited capacity to modify the planned meals.

Health Issues
It is also your responsibility to take all personal medication required for the duration of the excursion and inform trip leaders of any issues that might arise during the trip. As we will be in remote locations that are unlikely to have mobile phone reception, advance warning of any potentially serious issues is common sense and necessary.
Most days on the excursion involve spending approximately eight hours spent in isolated field areas, during which you will be walking and making observations and interpretations over locally rugged but not steep terrain. The mean diurnal temperature range for the area in July is 4–20°C, but nights can be much colder (minus 10°C) and days warmer (30°C). Participants should be physically capable of such activity.
All participants are expected to have attained competency in HLTFA311A Apply First Aid (or equivalent), through a registered training organization.
<table>
<thead>
<tr>
<th>Criteria</th>
<th>Pass</th>
<th>Credit</th>
<th>Distinction</th>
<th>High Distinction</th>
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</thead>
<tbody>
<tr>
<td><strong>Rock, mineral and fossil identification</strong></td>
<td>Correctly identify and describe the basic minerals, fossils and rock units in the assigned project area.</td>
<td>Correctly identify and describe all common minerals, fossils and rock units in the assigned project area.</td>
<td>As for credit, and correctly interpret nuanced relationships (depositional environments, facies variations, igneous petrogenesis, metamorphic grade variations).</td>
<td>As for distinction, and show a flair in the interpretation of nuanced relationships (depositional environments, facies variations, igneous petrogenesis, metamorphic grade variations).</td>
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<tr>
<td><strong>Geological unit mapping</strong></td>
<td>Correctly interpret the basic geological relationships, correctly represent the relationships on the base map or air photograph and include a geological legend that correctly represents and labels the basic chronological relationships.</td>
<td>As for pass, and the stratigraphy of appropriate units will be well defined with type sections indicated, and the structure will be well constrained with an appropriate amount of data. Geological legend will correctly represent and label most chronological relationships.</td>
<td>As for credit and include accurate detail. The stratigraphy of appropriate units will be well defined with type sections indicated, and the structure will be well constrained with an appropriate amount of data. An advanced level of achievement will be indicated from careful accurate work indicating a high level of understanding of complex relationships.</td>
<td>As for distinction. An exceptional level of achievement will be indicated from detailed and accurate work, and demonstrate an exceptional level of understanding of complex relationships. Evidence of independent reading, cross-disciplinary understanding and initiative is expected.</td>
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<td><strong>Cross Sections / Block diagrams</strong></td>
<td>Indicate an adequate capacity to interpret 3D relationships through the construction of appropriate and reasonable sections or block diagrams.</td>
<td>Correctly interpret 3D relationships through the construction of appropriate sections or block diagrams.</td>
<td>As for credit, with accurate detail, and the structure will be well constrained with an appropriate amount of data. An advanced level of achievement will be indicated.</td>
<td>As for distinction. An exceptional level of achievement will be indicated from accurate work and the resolution of complex relationships.</td>
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<tr>
<td><strong>Structural geology</strong></td>
<td>Demonstrate the capacity to interpret and document the basic structural features, including folds, faults and superposed foliations in multiply deformed rocks. Be able to represent relevant field data and perform basic manipulations in common stereonet formats.</td>
<td>Correctly interpret and document structural features, including folds, faults and superposed foliations in multiply deformed rocks. Be able to represent relevant field data and perform manipulations in common stereonet formats.</td>
<td>As for credit, with accurate detail, and the structure will be well constrained with an appropriate amount of data. An advanced level of achievement will be indicated from accurate work.</td>
<td>As for distinction. An exceptional level of achievement will be indicated from accurate work and the resolution of complex relationships.</td>
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<tr>
<td><strong>Geological history</strong></td>
<td>Synthesise the field and mapping data to produce a reasonable geological interpretation.</td>
<td>Synthesise the field and mapping data to produce a reasonable and detailed geological interpretation.</td>
<td>As for credit, with accurate detail justified from field observation. An advanced level of achievement will be indicated from careful accurate work.</td>
<td>As for distinction. An exceptional level of achievement will be indicated from detailed insight related to personal observations and interpretations. Evidence of independent reading, cross-disciplinary understanding and initiative is expected.</td>
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*Note: Students MUST attain a pass or higher grade in ALL of the subject areas indicated above.*