CREATE Summer School Student Group Activity

As part of the summer school you will work in a small group to look at an example in QCS. We have chosen the shallow water equations on the f-plane as a guide and the way they have been extended. We have provided you and your group reading material, slides and code. You should learn from these materials, and then decided as a group on a goal of something to actively explore (this includes code writing and code running; the balance between the two is up to you). Group members have varying experience and a perfectly valid exercise is to develop something that brings everyone up to the same level of understanding. The CREATE experience is essentially this mix of teaching/learning/research (though you get to do it in one week!). Each group has been chosen so that at least one member has access to UW's larger computing machines so that you should not be constrained by computational resources. Derek Steinmoeller is available to provide help with computing issues and since some of the background material is work he was part of he is well-suited to providing guidance on more than just computing. The participating co-PIs can provide discussion based on their own experience.

You will present your explorations/results on the Friday (and as part of the task you will create an abstract outlining what you have done that will be posted on the QCS web site). It is a short amount of time and we have other fun activities planned, so scoping and division of labour are both big parts of what we are asking you to do. Our basic philosophy is that the "thesis work" part of graduate school is not representative of the typical post-graduate experience and learning to successfully collaborate is as much the topic as "extensions of shallow water equations".

Here are a few examples of topics to explore (you are not restricted to these):

1. Slow-fast dynamics.
2. Shock formation in rotating shallow water equations and how non-hydrostatic effects modify the process.
3. The instabilities of jets.
4. The effect of nonhydrostatic corrections on energetics and ways to optimize the corrections.
5. The effect of rotation and/or nonhdyrostatic corrections on ray tracing methods for waves.
6. How the SW equations apply to wind-driven motions (the so-called reduced gravity equations).

For many of these the co-PI team will have further references to share, so spend the lab times actively talking to the team.