# Justification of resources: Shared frameworks for next-generation ice sheet modelling

## Investigator time

The UK team assembled for this project comprises leading glacial modellers with a track record in developing community ice sheet models and coupling them to climate models. They have all been involved with Glimmer-CISM since it was first released as a community model, and are consequently the best group of people to take this work forward.

PI Rutt will be responsible for overall coordination of the project. As chair of the international Glimmer-CISM steering committee, he has been working closely with the Co-Is and project partners for several years. His specific responsibilities, along with those of Co-Is Hulton and Payne, and Researcher Co-I Hagdorn, are detailed in the Case for Support. We have allocated PI/Co-I time according to these responsibilities: Rutt: 3.75 hours per week (10%); Hulton: 2.2 hours per week (6%); Payne: 2.2 hours per week (6%); Hagdorn: 18.5 hours per week (50%). We have chosen to allocate substantial time to Hagdorn rather than employ a PDRA because of the deep knowledge of both ice sheet modelling in general and Glimmer-CISM in particular which he brings to the project. We regard this as likely to be considerably more cost-effective than employing a PDRA without those skills. Hagdorn’s position at the University of Edinburgh allows up to 50% of his time to be dedicated to a project such as this.

## Graduate programmer salary

We requests funds to employ a graduate-level programmer in Swansea for three months to work on a Graphical User Interface for Glimmer-CISM. The skill-set required for the work is at the level of BSc or MSc. We anticipate being able to recruit a programmer from the cohort of Swansea Computer Science graduates. We will work with the CS department, with which Rutt has strong links, to publicise the vacancy. Salary is set at Swansea Grade 7, point 28, according to local norms. The programmer will be managed by Rutt.

## Framework development workshops

These workshops are central to the success of the project, and it is essential that they attract participants from across the international climate and ice sheet modelling communities. Accordingly, we have allocated significant resources to them, in particular to allow us to fund travel, accommodation and subsistence for workshop participants. We have costed for 24 participants in each workshop, which we judge to be a number which will allow as many interested parties as possible to attend, while keeping discussions manageable. The funding requested for participant travel (£500 per person, per workshop) is an average value, reflecting the fact that participants will travel different distances to attend. Accommodation and venue hire costs are estimated on the basis of purchasing an integrated conference package from the workshop venue. In addition, we have allowed for secretarial support for each workshop, which will ensure the organisation runs smoothly. Twenty days support per workshop is requested: secretarial support will include managing venue bookings, participant registration, catering, accommodation, and travel bookings for participants. Costs for secretarial support are calculated according to local norms at Swansea (£2295) and Edinburgh (£?NRJH?).

## Training events

The resource allocation for the training events is modest. In particular, the requested funds do not include travel or accommodation for participants, who will be expected to fund these themselves. Accordingly, the administrative requirements are lighter, and do not require dedicated secretarial support. We request funds to pay suitably-experienced, Bristol-based graduate students to write training materials and documentation on a per-hour basis. Funding is requested for two tutors to attend training events (accommodation, travel and subsistence): these will be drawn from the core project team (PI and Co-Is). Funding is likewise requested for venue hire.

## Travel

***UK Travel***. Close collaboration will be necessary between UK-based project members during the course of the project. Much of this will be done electronically – we already make full use of teleconferencing – face-to-face contact is essential as well. We request resources for 12 one-day meetings, each involving all four investigators (Rutt, Hulton, Hagdorn and Payne). These will take place approximately quarterly, and will be split between the three project sites.

***Conference Attendance.*** Community participation in the project and dissemination of outputs is a key activity. We of course expect to attract the most interested members of the climate and ice sheet modelling communities to the Framework Development Workshops, but wider dissemination within the Geosciences community will be essential. In the early stages, we will need to raise awareness of the project; later, we will be concentrating on disseminating the outputs. Therefore, we request resources for attendance of two investigators at six international conferences over the course of the grant. Our main focus will be the AGU Fall Meeting and the EGU General Assembly, although we may choose to substitute specialist glaciological or climate science conferences if these opportunities arise. We expect to attend two conferences in each year of the project.

## Other

We request a Linux workstation for Hagdorn to carry out code development and other project activities.

We request a sum (£4000) for professional development of the project website: this is an essential public and community-facing portal for our impact activities.

We request page charges (£2000 in total) for two publications in peer-reviewed journals. These will contribute to the dissemination and profile of key project outputs. It is anticipated that a publication in *Geoscientific Model Development* (or similar journal) will comprise the definitive technical reference for the model framework, and is therefore of crucial importance.