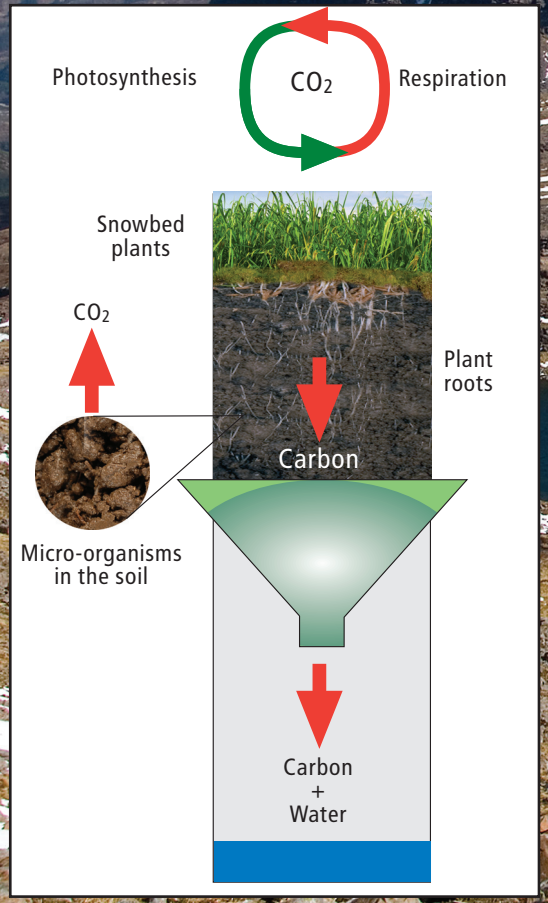
How will climate change affect snowbed community function?

Snowbeds are carbon 'hotspots'

Our study looks at the effects of climate change on a snowbed community dominated by mat grass *(Nardus stricta)*. This community is widespread in the Scottish mountains and occurs where snow lies late in spring.

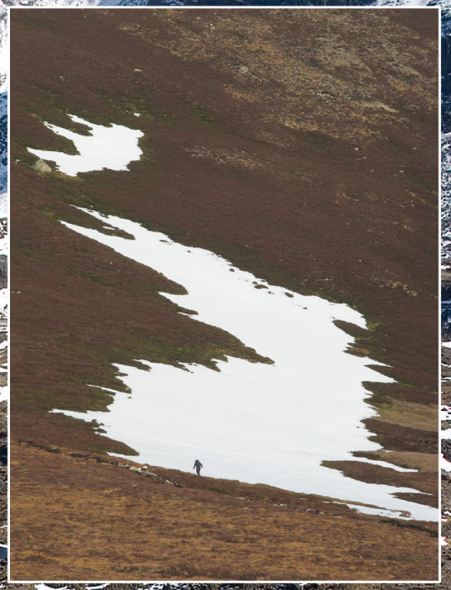
Plants in this community are irrigated by snow-melt and grow productively. A large stock of carbon (C) builds up in the soil from the plant remains. These snowbeds are hotspots for C storage in the mountain landscape; their soils hold more carbon than many surrounding vegetation types.



How do we study carbon flows?

We are using 13C (a natural carbon isotope) to follow the fate of carbon which is taken up by snowbed plants during photosynthesis. We use the isotope to trace how the carbon moves from the air, into the plants and from the plants into the soil and finally into the soil water.

Half of the experimental cores will be exposed to a drought, simulating a reduction in the supply of meltwater. We will investigate what effect this may have on the productivity of the plants and the flow of carbon between plants, soil and water.



Mountain climates are changing

Climate change predictions for Scotland suggest rising temperatures and a reduction in winter snow fall of **50 – 90% by 2080**.

Less snow means less time with meltwater from snowbeds irrigating the surrounding vegetation. This could lead to an **increased frequency of drought** in spring and summer.

If the wet snowbed soils dry out, the carbon stored in the soil may be more rapidly released back to the atmosphere by soil microbes. Drought can also reduce the amount of new carbon fixed from the atmosphere by plants as they grow. This would reduce new carbon inputs to the soil from plant remains and further deplete overall carbon storage.