

in the amplitude of the Mauna Loa intra-annual fluctuation over a 10-year period from the early 1990s, and they attribute this to the severe droughts in North America; however, the authors suggest a return to more normal conditions after 2004.

Other studies have also demonstrated an absence of any evident reduction in biomass efficiency: Gloor *et al.* (2010) present evidence of a linear relationship between the rate of carbon uptake by land and ocean and the levels of ambient atmospheric CO<sub>2</sub>; Poorter and Navas (2003) review numerous laboratory experiments and report that biomass uptake would be around 50% greater under a doubling of historical atmospheric CO<sub>2</sub> levels; Knorr (2009) finds an unchanging partition between atmospheric and sequestered carbon; while Raupach *et al.* (2008) find no implication that carbon sinks are weakening, although the rate of growth of uptake has fallen slightly behind the growth in emissions.

## Conclusions

In summary, our analysis has provided evidence of the following:

- (i) A possible extension of the duration of CO<sub>2</sub> uptake by bioaccumulation in the Northern Hemisphere summer (i.e. extended growing season).
- (ii) An increase in the variability in the amount of CO<sub>2</sub> absorbed by Northern Hemisphere bio-accumulation each summer (i.e. possibly increased weather extremes).
- (iii) A small decline in the ability of Northern Hemisphere bioaccumulation to absorb CO<sub>2</sub> from the atmosphere (i.e. possibly

the onset of positive climate change feedback).

These findings are potentially worrying because of the implication that more extreme and more variable weather patterns may possibly be adversely impacting the planetary biosphere's ability to absorb CO<sub>2</sub> from the atmosphere. The conclusion that positive climate change feedback may just be beginning to be observable at a planetary scale should further encourage more research to arrive at firmer conclusions and should support yet more determined action to reduce man-made emissions with even greater urgency.

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## Letters

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### Soundtrack to a storm

John Turnpenny's (2016) evocative account of his ascent of Cairn Gorm last summer, and hasty escape from a thunderstorm, was beautifully written, scientifically accurate, and generally a pleasure to read. However,

his personal soundtrack to the gathering storm, *Night on a Bare Mountain* by Modest Mussorgsky, was inspired by the supernatural rather than the meteorological. A more apt accompaniment would probably have been Richard Strauss's *Alpine Symphony*, which portrays a journey up a mountain, initially in the sunshine, with a spectacular aural depiction of a thunderstorm near the summit (Aplin and Williams, 2011). Furthermore, the peaceful closing sections of the piece, after the hasty retreat back down the mountain to safety, would be the perfect accompaniment to Turnpenny's post-hike tea and shortbread. Do other

readers have favourite music to imagine when experiencing significant weather?

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