Erratum
'An easterly tip jet off Cape Farewell, Greenland. II: Simulations and dynamics'

S. D. Outten,* I. A. Renfrew and G. N. Petersen
School of Environmental Sciences, University of East Anglia, UK
*Correspondence to: S. D. Outten, School of Environmental Sciences, University of East Anglia, Norwich, NR4 7TJ, UK.
E-mail: stephen.outten@googlemail.com

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The above article was originally published on Early View on 20 November 2009, and subsequently in volume 135 (issue 645), pp 1934–1949, DOI:10.1002/qj.531.

There was an error in the sign of the turbulent flux-divergence term of the momentum budgets plotted in Figures 10, 11 and 12 of Outten *et al.*. (2009). Consequently the momentum budget residual that is shown is also in error; it is too large by about an order of magnitude. Corrected versions of these figures are reproduced below and accompanied by these brief comments.

Following the sign correction the revised momentum budgets have a residual that is much smaller in magnitude and significantly smaller than that of the other forcing terms. This small remaining residual must be due to unaccounted-for contributions arising from differences between the momentum budget as we calculated it, see Outten *et al.*. Eqs (1), (2) and (4), and the formulation used in the numerical model (the MetUM); for example, contributions from model diffusion. This was the explanation given for the residual in the original budgets (paragraph 3 on page 1945) and the discovery of a sign error does not make this incorrect. The large magnitude of the residual was a point of consternation in the original paper and was not fully explained but left to 'further investigation'. It seems that further investigation is now not necessary.

In the along-jet direction the change in the sign of the flux-divergence term means that this term now acts to decelerate the jet, which makes physical sense. In paragraph 2 of page 1946 there is a discussion of the turbulent flux divergence and, in particular, its 'decrease in height' – this discussion is still valid if one regards it as pertaining to the *magnitude* of the flux divergence.

Note the conclusions of the dynamical analysis are *not* made invalid by this error. However we would suggest a change in emphasis is warranted, away from the (now relatively small) residual and on to the (still important) turbulent flux-divergence term. In the Abstract of the original paper it was stated that:

'Over the curved part of the locus, as the jet rounded Cape Farewell, a cross-jet residual suggests that the jet was unbalanced at the height of the jet core. This residual decreases with height so that an approximate gradient wind balance applies in the upper part of the jet.'

It would be more appropriate if this said:

'Over the curved part of the locus, as the jet rounded Cape Farewell, a cross-jet *turbulent flux divergence* suggests that the jet was unbalanced at the height of the jet core. This *flux divergence* decreases in magnitude with height so that an approximate gradient wind balance applies in the upper part of the jet.'

We would like to apologise for this error and sincerely thank Dr William Ingram (Oxford University and Met Office Hadley Centre) for prompting a re-evaluation of the sign of the flux-divergence term, following a presentation of this work.

Reference

Outten SD, Renfrew IA, Petersen GN. 2009. An easterly tip jet off Cape Farewell, Greenland. II: Simulations and dynamics. *Q. J. R. Meteorol. Soc.* **135**: 1934–1949.

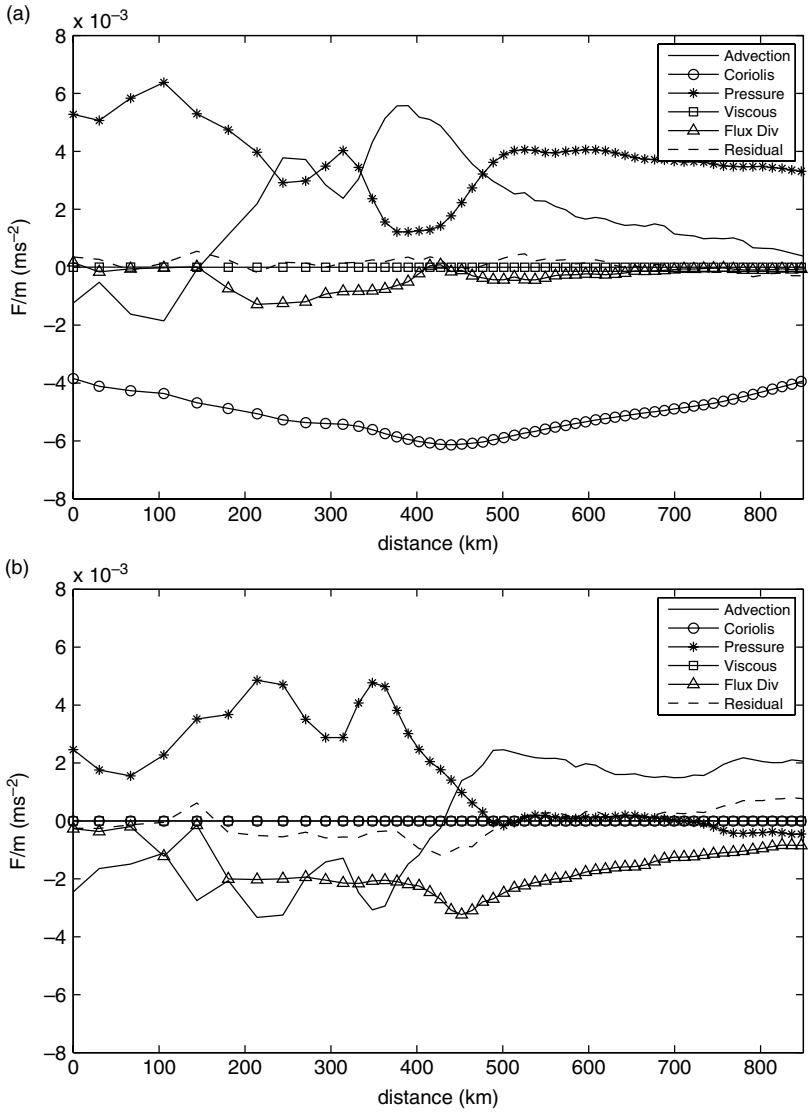

Figure 10. The cross-jet (top) and along-jet (bottom) components of the momentum budget, in terms of force per unit mass (F/m), shown against distance along the jet locus. The forces shown are the advection (solid line), Coriolis (circles), pressure gradient (asterisks), viscous stress (squares) and turbulent momentum flux divergence (triangles). The residual is also shown (dashed line).

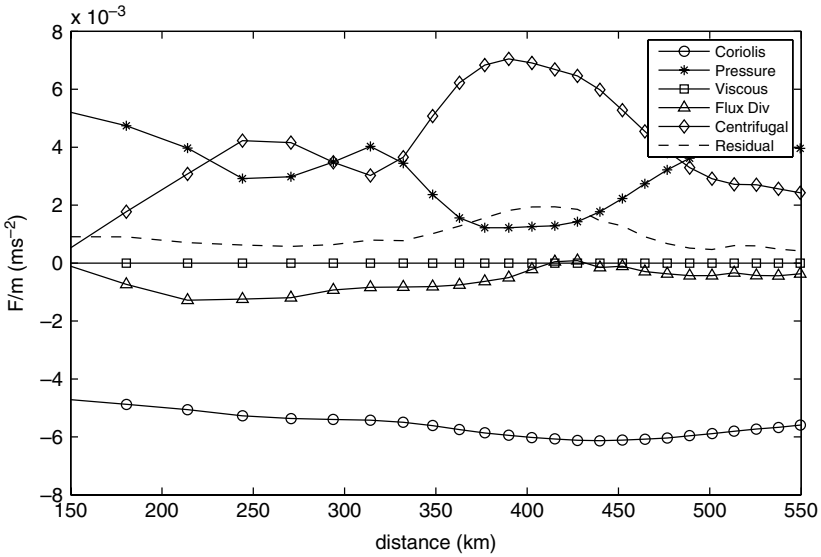

Figure 11. The cross-jet components of the momentum budget shown over the region of imbalance. The forces shown are the Coriolis (circles), pressure gradient (asterisks), viscous stress (squares) and turbulent momentum flux divergence (triangles). The calculated centrifugal force is shown (diamonds) along with the residual (dashed line).

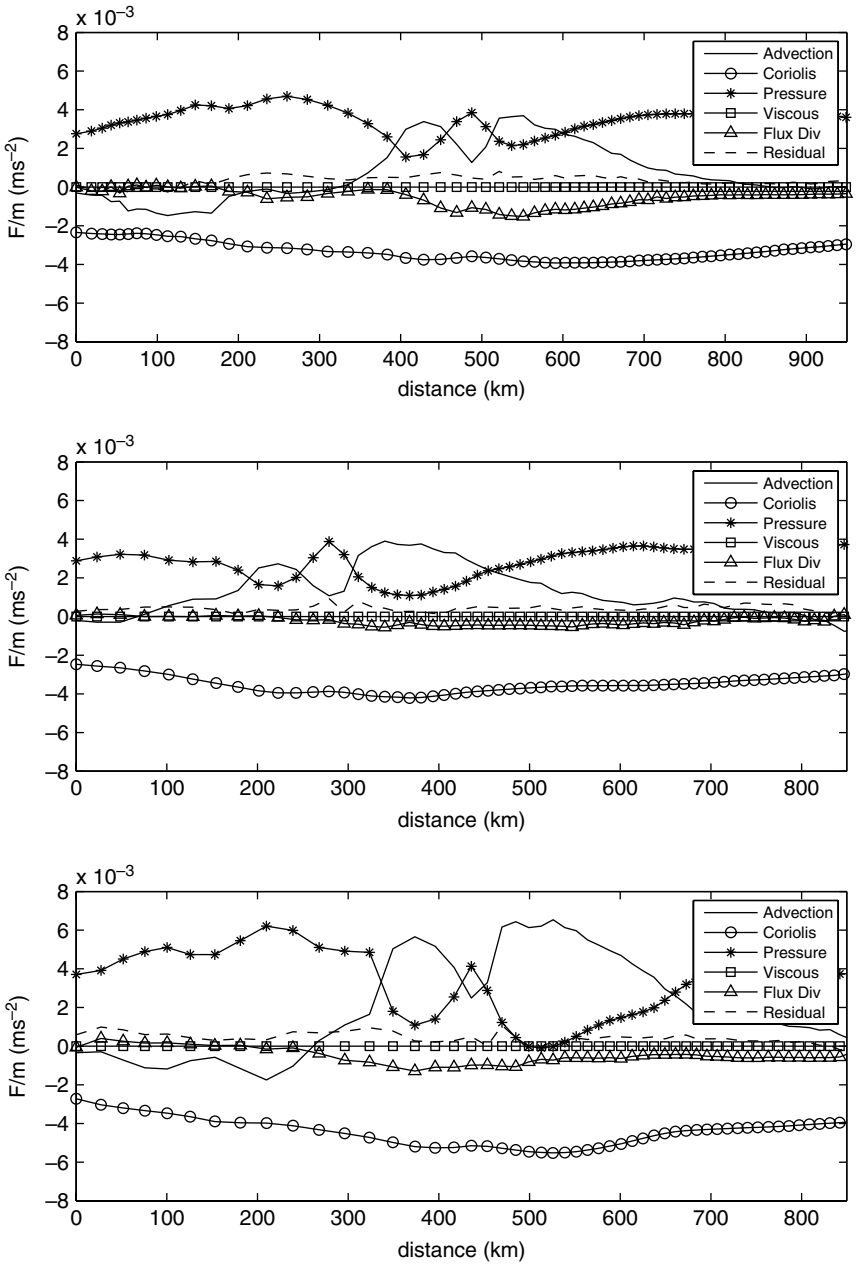

Figure 12. The cross-jet components of the momentum budget for 13 January 2008 (top), 11 January 2008 (middle) and 10 February 2007 (bottom) are shown against distance along the jet locus. The forces shown in each plot are the advection (solid line), Coriolis (circles), pressure gradient (asterisks), viscous stress (squares) and turbulent momentum flux divergence (triangles). The residual is also shown (dashed lines).

