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# Erratum: Dissecting the turbulent weather driven by mechanical AGN feedback

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This is an Erratum to the paper entitled 'Dissecting the turbulent weather driven by mechanical AGN feedback', which is published in MNRAS, 498(4), 4983–5002 (2020).

We found and corrected two errors in the post-processing analysis code involved in the calculation of baroclinic and advective source term in the Eulerian analysis, which is only a minor part of the main paper (section 3; most of the paper is indeed focused on the Lagrangian analysis)

We repeated the calculation. For both terms, the new results show different values than previously estimated. Thus, the computation of the effective source term, see equation (1) of the original paper, and the relative contribution of each dynamical term, see equation (9) of the original paper, are also affected. Consequently, the second panel of figs 1 and 2, and the second and third panels in fig. 4 of the original paper need to be replaced with Figs 1, 2, 3 and 4 of this Erratum, respectively.

The updated advective and baroclinic term yield larger values than estimated in the original paper, again solely for the Eulerian analysis. The maximum amplitude of the advection term increases by a factor $<2$, as seen in Fig. 4 below. The baroclinic term increases by several orders of magnitude; however, throughout most of the volume, its relative strength remains subdominant compared with the compressive and stretching terms, as shown in Fig. 2 below. Only in localized patches in the inner region, the baroclinic term can become substantial and exceed the amplitude of the other terms. This is shown by the large mean of the effective term in Figs 1 and 3. As this large baroclinic term is confined to a small region in the volume (thus rarely intersected by the Lagrangian particle tracers), the overall conclusions remain the same. However, the last part of the the second bullet point in the Conclusion (section 5) of the original paper shall be updated as follows:

(i) In the Eulerian (volume-wise) frame, the evolution of enstrophy depends, in principle, on its advection, compression, stretching, and baroclinic terms (equation 1 in the original paper). However throughout most of the volume, the key drivers are found to be stretching and divergence/rarefaction motions, while advection

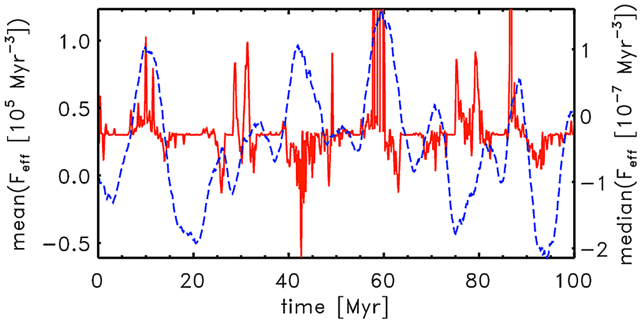


**Figure 1.** Eulerian analysis of the effective source term. The red solid lines is the mean, while the blue dashed line is the median computed across the grid (notice the respective, different left/right *y*-axis labelling). Compared to the original plot, the evolution of the median is similar: the number of peaks remain the same, while their amplitude varies. However, their relative strengths also remain similar. The evolution of the mean is instead significantly different to that in the original paper. This is due to the baroclinic term, which is now significant in the computation of the mean. To make the evolution of the mean more visible, we limited its range to values below $\sim 10^5$ Myr$^{-3}$ (the peak at $\sim$60 Myr reaches values of a few $10^7$ Myr). This plot is the replacement for the second panel of fig. 1 in the original paper.

becomes relevant only rarely and intermittently (figs 2 and 3). Dominant vortex stretching (instead of squeezing) is a signature of subsonic/incompressible turbulence. Baroclinicity is sub-dominant throughout largest part of the volume. However, it can become substantial in inner localized patches due to misaligned pressure and density gradients. We will perform a detailed analysis of the local properties of the baroclinic term in a forthcoming paper.

As a typographical correction, we noticed that the labels of the colourbar in fig. 6 of the original have to be swapped: the red bar should be $F^-$ and the the blue bar should indicate $F^+$.

In passing, we remark that the Lagrangian analysis, which is the main part of the original paper, was not affected by the above described error. Hence, the vast majority of the results and plots in the original paper remain untouched.

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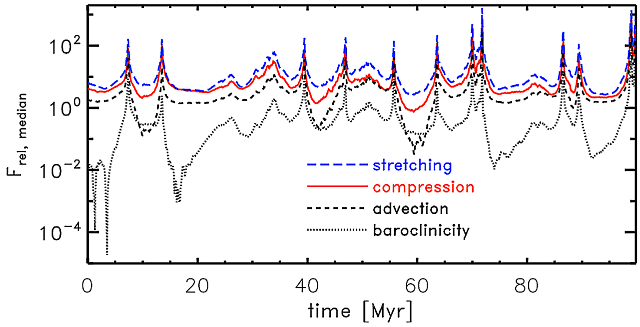


**Figure 2.** Eulerian analysis: median of the relative contributions of the different source terms (as absolute value) computed on the grid (see equation 9 in the original paper). The blue solid line is the compressive/rarefaction term, the red long-dashed line is the stretching term and the black short-dashed line is the advection term. The black dotted line displays the relative contribution of the baroclinic term. We note that, as the effective term is the sum of both positive and negative values, each relative term $F_{\rm rel}$ is often $>1$; for similar reason, the related peaks can also differ from those in figs 1 and 3 in the original paper. This plot is the replacement for fig. 2 in the original paper.

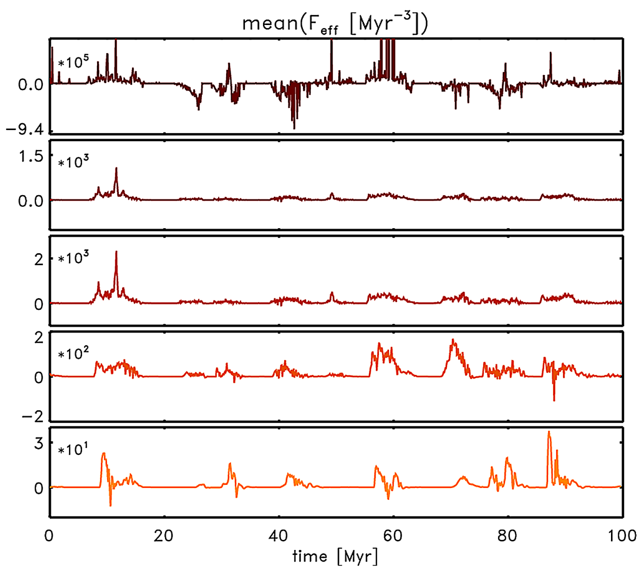


**Figure 3.** Eulerian analysis: evolution of the mean values of effective dynamical term. The mean values are computed within pairs of short cylinders aligned with the bipolar jet path, with a cylindrical radius of 15 kpc and increasing distance from the AGN (≈1, 9, 18, 36, 72 kpc; dark red to bright yellow colour/top to bottom panel). This plot is the replacement for the second panel of fig. 4 in the original paper. However, due to the large spread in amplitudes, we do show the results for each cylinder separately and not in the same plot. The evolution of the mean effective source term is significantly different to the one in the original paper. This is inherent to the baroclinic term, which can locally dominate the mean.

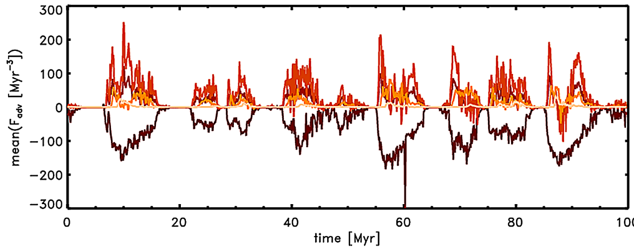


**Figure 4.** Eulerian analysis: evolution of the mean values of the advection term. The mean values are computed within pairs of short cylinders aligned with the bipolar jet path, with a cylindrical radius of 15 kpc and increasing distance from the AGN (≈1, 9, 18, 36, 72 kpc; dark red to bright yellow colour). This plot is the replacement for the third panel of fig. 4 in the original paper. The mean advective term is slightly larger than previously estimated.

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