



Notes:

- 1) Data marginal respect to gaps of at least 5 half hours or isolated values are flagged. This has been decided because due to the heterogeneity of the database we can not be sure about the quality of these measurements
- 2) For the u^* threshold calculation a value of 0.99 has been selected as indicator (see section 2.3 in [1]). The u^* threshold has been calculated on the basis of 6 temperature classes for each season and 100 bootstrapping extractions.
- 3) The half hour just after a period of low turbulence has been flagged since it could be affected by two different problems: it could have been affected by an initial period of low turbulence or the CO_2 accumulated in the low turbulence period could have been removed all together and measured by the eddy system; in this case, if the storage is not measured with a profile, there would be an overestimation of respiration.
- 4) Before the gapfilling, data considered as low quality has been removed. These includes: out of ranges, spikes flagged with $z = 5.5$ (see section 2.2 in [1]), data acquired with u^* below the threshold, data just after a period of low turbulence, marginal point as described in the note 1.
- 5) The ANN can be applied only if all the input data required are present. In case of gaps where one or more input was missing, only the MDS method has been applied. In this case the NEE_f_delta and GPP_f_delta variables are equal to -9999
- 6) The aggregation of the NEE and GPP has been done according with these criteria and priorities for each single half hour: I) NEE calculated using the CO_2 storage sent by the PI (NEE_or) (quality flag=1), II) NEE obtained using the storage calculated from the single point measurement ($NEEst$, quality flag= 2), III) NEE or gapfilled with high confidence (quality flag=3), IV) $NEEst$ gapfilled with high confidence (quality flag=4), V) NEE or gapfilled with low confidence (quality flag=5), VI) $NEEst$ gapfilled with low confidence (quality flag=5), VII) data not gapfilled (quality flag=7). The gapfilling quality has been defined according with the appendix in [2] with high quality the A cases and low quality the B and C cases.

References:

- [1]: Papale D., et al. (2006) Towards a standardized processing of Net Ecosystem Exchange measured with eddy covariance technique: algorithms and uncertainty estimation, Biogeosciences, (3), 571-583
- [2]: Reichstein M., et al. (2005) On the separation of net ecosystem exchange into assimilation and ecosystem respiration: review and improved algorithm. Global Change Biology (11) 1424-1439
- [3]: Moffat A., et al. (2007) Comprehensive comparison of gap-filling techniques for eddy covariance net carbon fluxes. Agricultural and Forest Meteorology (147) 209-232
- [4]: Papale D., Valentini R. (2003) A new assessment of European forests carbon exchanges by eddy fluxes and artificial neural network spatialization. Global Change Biology (9) 525-535