



## **Towards a consistent eddy-covariance processing: a comparison between EddyPro and TK3**

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The eddy-covariance processing sequence, needed to obtain accurate mass and energy fluxes starting from turbulence data is complex, depending on the instruments of choices and their deployment, the site characteristics, and the atmospheric turbulence peculiarities, at a minimum. Eddy-covariance software available to the community support different implementations, all valid in principle, and often the same procedures are therein implemented in different ways, or different order. In addition, many groups use “in-house” collections of scripts that may include customized implementations. It is often found that such differences do show up to the researcher who attempts a software inter-comparison, as either systematic or random differences in resulting fluxes.

In this work we present a comparison of two popular eddy-covariance software, namely EddyPro and TK3. The aim of the comparison is twofold: on the one side, we want to show that the two software can provide perfectly matching fluxes. On the other side, we want to stress on what it takes to achieve this result. In fact, performing a fair and rigorous software comparison is not a trivial task, and discriminating actual discrepancies in the results from inaccuracies in the software configuration may be beyond the possibility of the researcher who does not control the source code. Being the developers of EddyPro and TK3 gave us the opportunity to discuss the comparison at all levels of details, and this proved necessary to get to a full agreement. However, normally this is not possible to the software user.

As a conclusion, we want to warn against “quick and dirty” inter-comparisons as a means to validate eddy-covariance software. To the aim of assuring consistency and inter-comparability of centralized flux databases, and for a confident use of eddy fluxes on the regional, continental and global scale synthesis studies, we also warn against the proliferation of in-house software. We rather suggest researchers to rely on established software, notably those that have been extensively validated in documented inter-comparisons.