

***Interactive comment on “New estimates of direct N<sub>2</sub>O emissions from Chinese croplands from 1980 to 2007 using localized emission factors” by B. Gao et al.***

**Anonymous Referee #2**

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Given the distributions of the original data shown in Fig. 2, and after looking at the spread of the distributions after log and cube root transformations of the data shown in Fig 3, I am very sceptical about the extremely small error range (only 2% of the mean) calculated for the upland sites resulting from the cube root transformation, and the range of c. 10% of the mean for the paddy field sites also seems on the low side. If, indeed, there is something incorrect in the calculation, then the mean values may also be affected, and this would have substantial knock-on effects elsewhere in the paper, in terms of the calculation of regional and national N<sub>2</sub>O emissions, and, for example, on the discussion at the bottom of p.6983.

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In Fig 2, there is no mention in the caption of what is represented by the more-or-less Gaussian curves superimposed on the two frequency distributions of the original data.

My other major comment is that there is insufficient information about the make-up of the 261 upland sites. The systems employed in China in upland cultivation systems are very diverse. They include not only cereal production under irrigated and non-irrigated conditions, but also very intensive vegetable and horticultural production, particularly in the environs of the major cities. The fraction of the total land area devoted to this production may be small, but it would be useful to know the fraction of total N fertilizer usage that goes into it, as the soils used in this way commonly receive very high rates of N fertilizer together with poultry and other organic manures and frequent irrigation, and the emission factors may be very different (and possibly very much bigger) than those measured in maize or wheat fields. How many out of the 261 sites were located in such vegetable/horticultural systems? A disaggregation of the data into the different production systems, followed by calculation of EFs for each type of system, and then only finally aggregating emissions to provincial or national level, would yield more credible results than the procedure described here.

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