

Interactive comment on “The consumption of atmospheric methane by soil in a simulated future climate” by C. L. Curry

Anonymous Referee #2

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General Comments:

The Curry manuscript describes a previously published soil CH₄ oxidation model and applies the model at the global scale to compare the regional patterns of CH₄ sink strength under different climate scenarios. The paper is well written, comprehensive, and the conclusions, results, and methods appear sound. Strengths include detailed analysis using maps and statistics to show how the relative importance of the drivers of CH₄ consumption (soil diffusivity, water content, and temperature) changes both spatially and temporally. A few suggestions to improve the paper are outlined below.

Specific Comments:

1. ERA-40 should be defined. 2. Page 6090 lines 24-25: this sentence is confusing and

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should be re-worded. 3. Page 9096: the section at bottom describing the comparison of pre-industrial climate shown in Table 3 should be moved to the Results section. 4. Table 2 should note which life zones include cropped lands and grasslands. 5. The paper does not include any comparisons of modeled CH₄ uptake rates with field data. Formal model validation may not be necessary, but at least some discussion comparing modeled values with measurements would give readers more confidence in model predictions. Particularly, CH₄ uptake rates in deciduous forests soils reported in Dong et al. (1998) and Goldman et al. (1995) are some what higher than those reported in Table 2 for this ecosystem type. 6. The axis/legend labels for figures 5 and 6 need to be larger.

DONG, Y., D. SCHARFFE, J.M. LOBERT P.J. CRUTZEN and E. SANHUEZA. 1998. Fluxes of CO₂, CH₄ and N₂O from a temperate forest soil: the effects of leaves and humus layers. *Tellus B* Volume 50, 243 – 252.

Goldman, M.B., P.M. Groffman, R.V. Pouyat, M.J. McDonnell and S.T.A. Pickett. 1995. CH₄ uptake and N availability in forest soils along an urban to rural gradient. *Soil Biology and Biochemistry* Volume 27, 281-286.

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