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Supplement of

Evaluation of modelled climatologies of O_3, CO, water vapour and NO_y in the upper troposphere–lower stratosphere using regular in situ observations by passenger aircraft

Yann Cohen et al.

Correspondence to: Yann Cohen (yann.cohen.09@gmail.com)

S1 Ozone

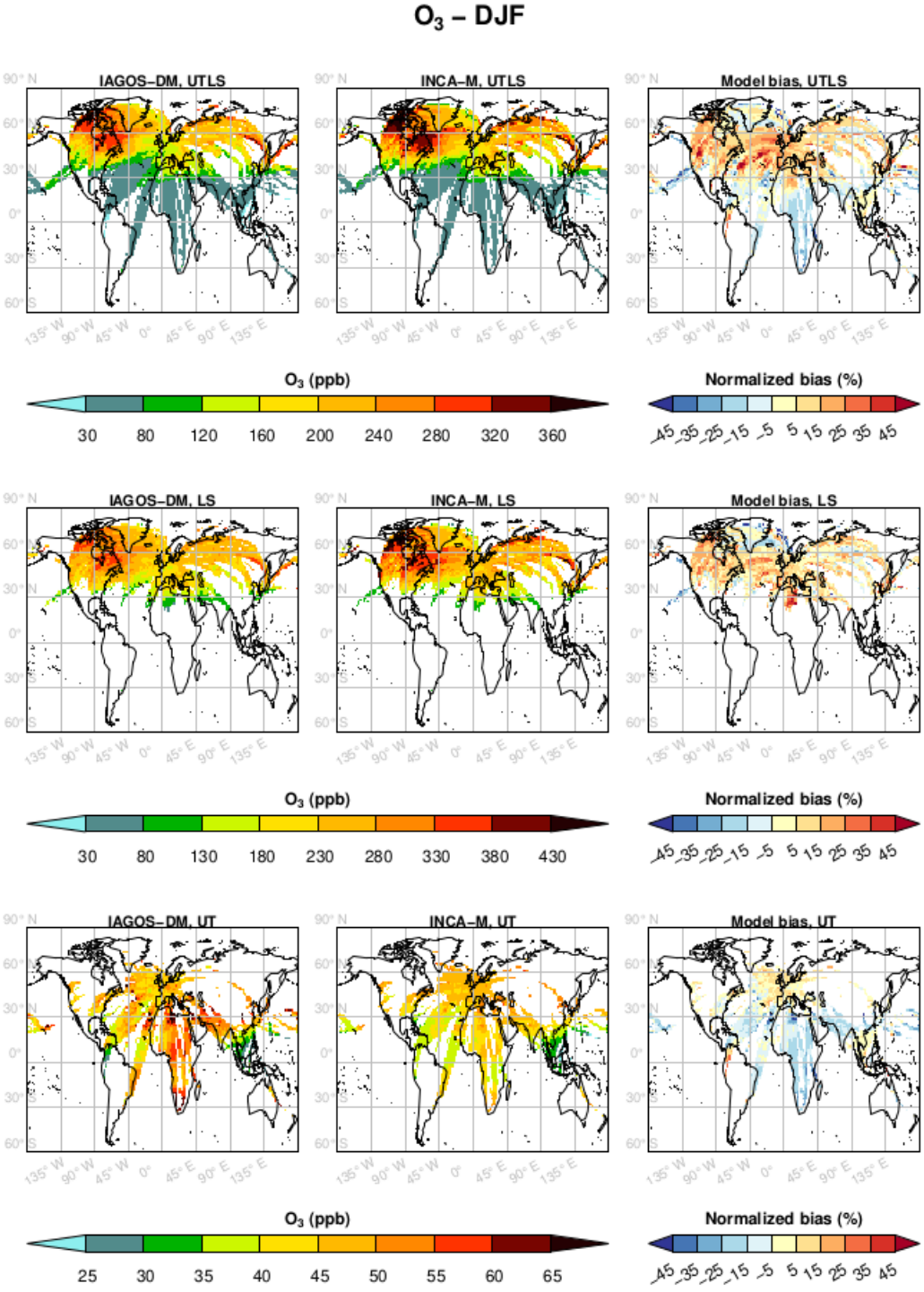

Figure S1. Ozone mean horizontal distributions during boreal winter from the end of 1994 until 2017, for the products IAGOS-DM (left) and INCA-M (middle), and the biases (right) normalized with respect to the mean values between the two products. Each row displays a layer, with the non-separated UTLS at the top and the distinct LS and UT below.

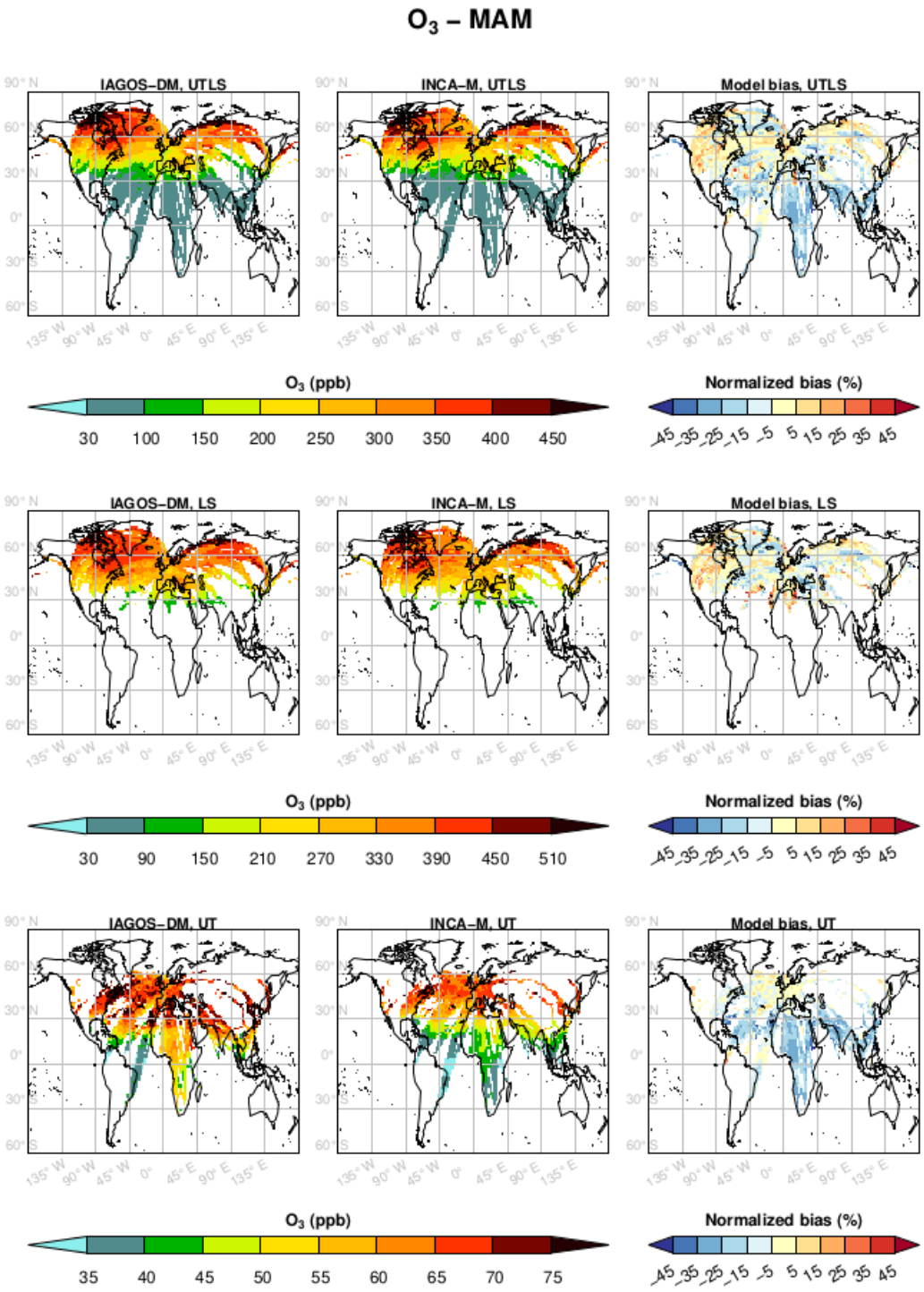

Figure S2. As Fig. S1 for boreal spring.

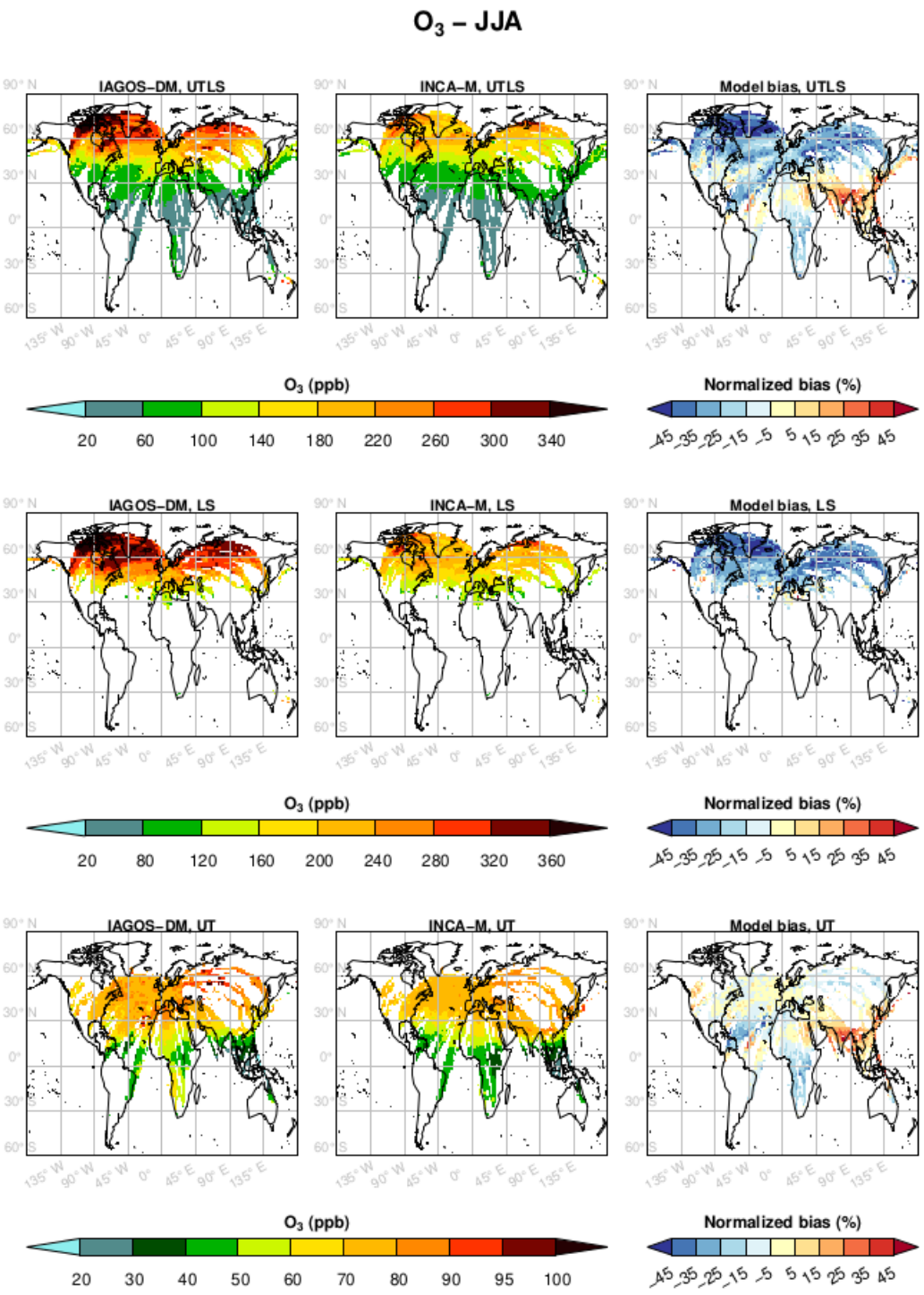

Figure S3. As Fig. S1 for boreal summer.

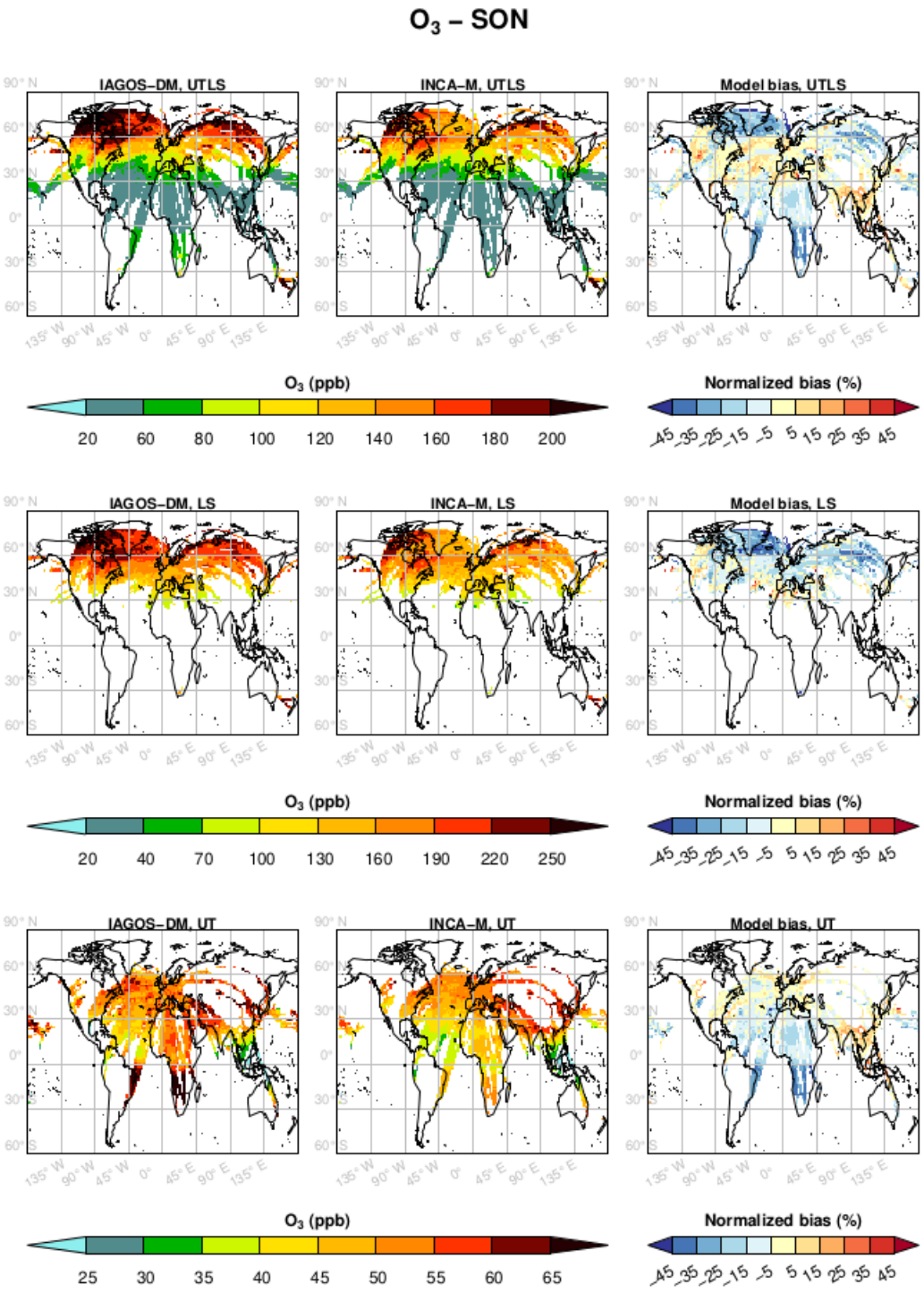

Figure S4. As Fig. S1 for boreal fall.

S2 Carbon monoxide

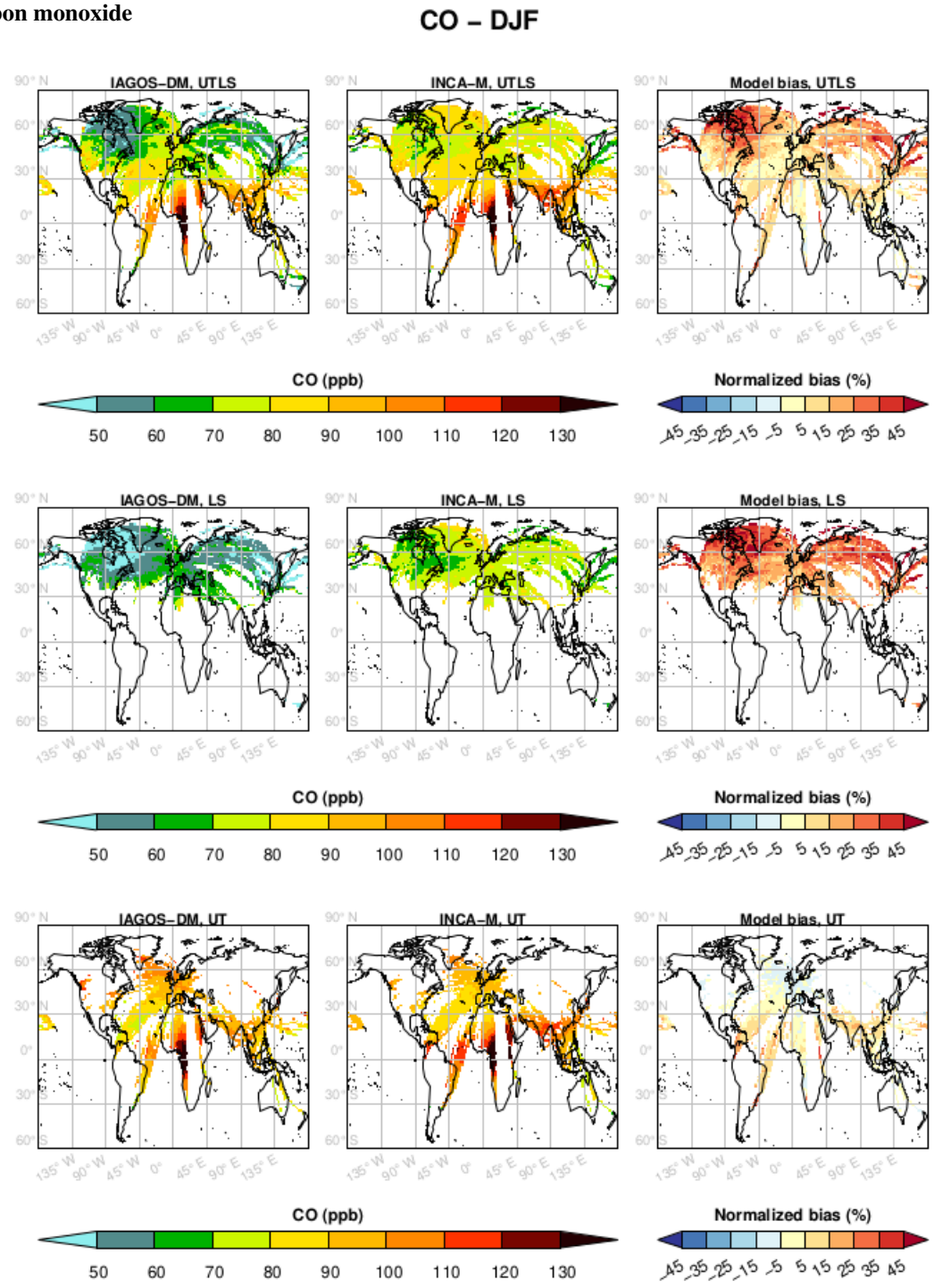

Figure S5. CO mean horizontal distributions during boreal winter from the end of 2001 until 2017, for the products IAGOS-DM (left) and INCA-M (middle), and the biases (right) normalized with respect to the mean values between the two products. Each row displays a layer, with the non-separated UTLS at the top and the distinct LS and UT below.

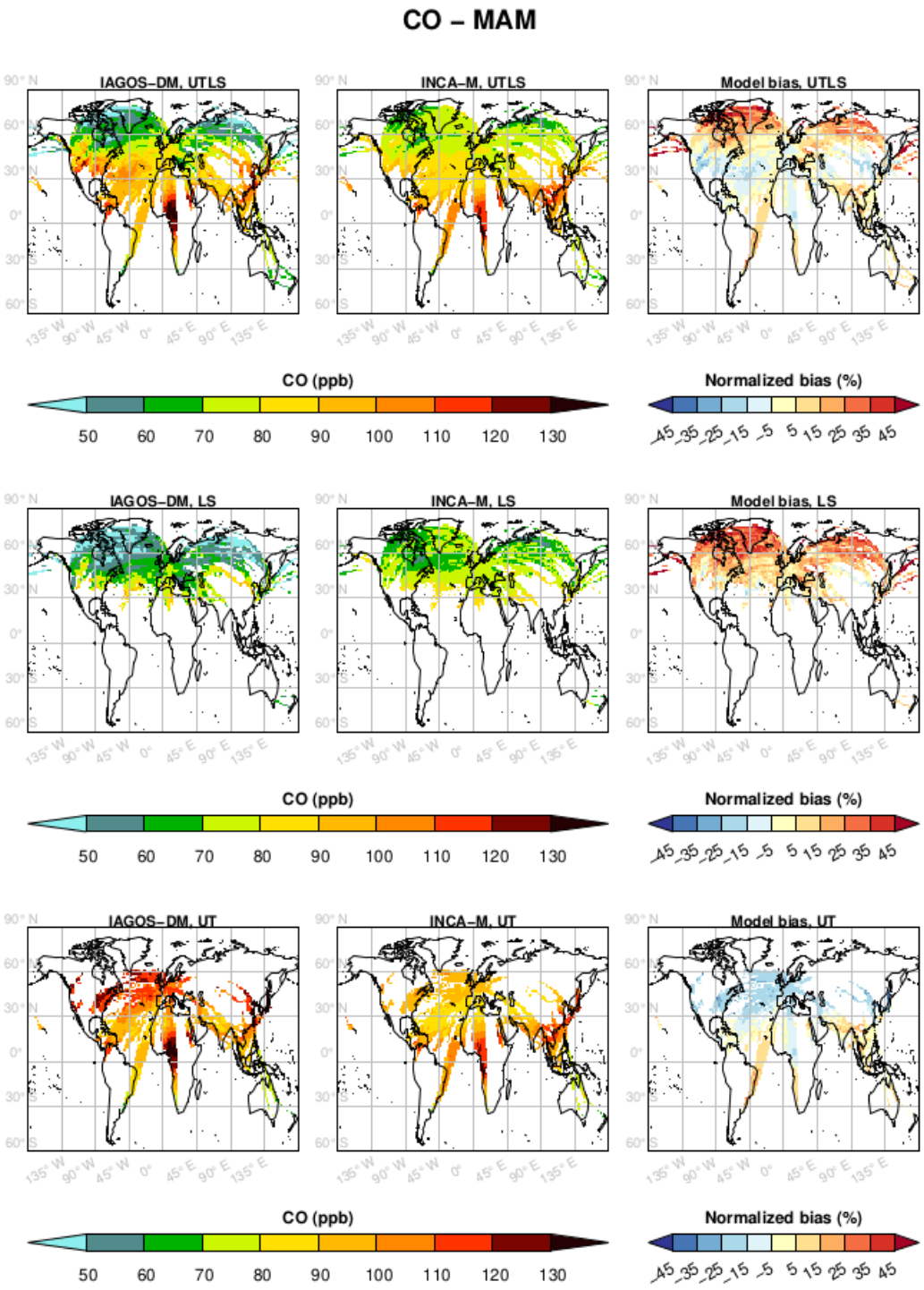

Figure S6. As Fig. S5 for boreal spring.

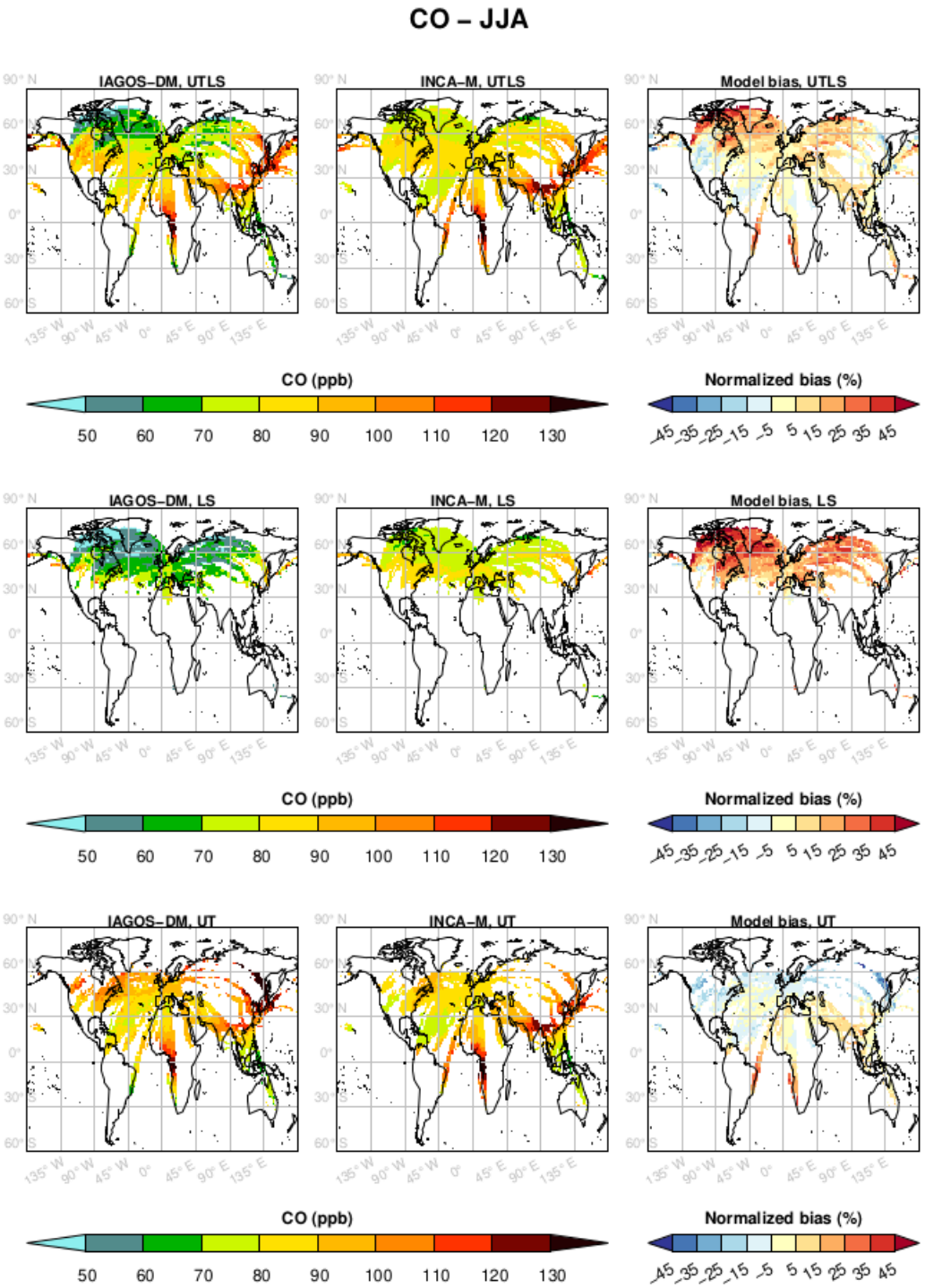

Figure S7. As Fig. S5 for boreal summer.

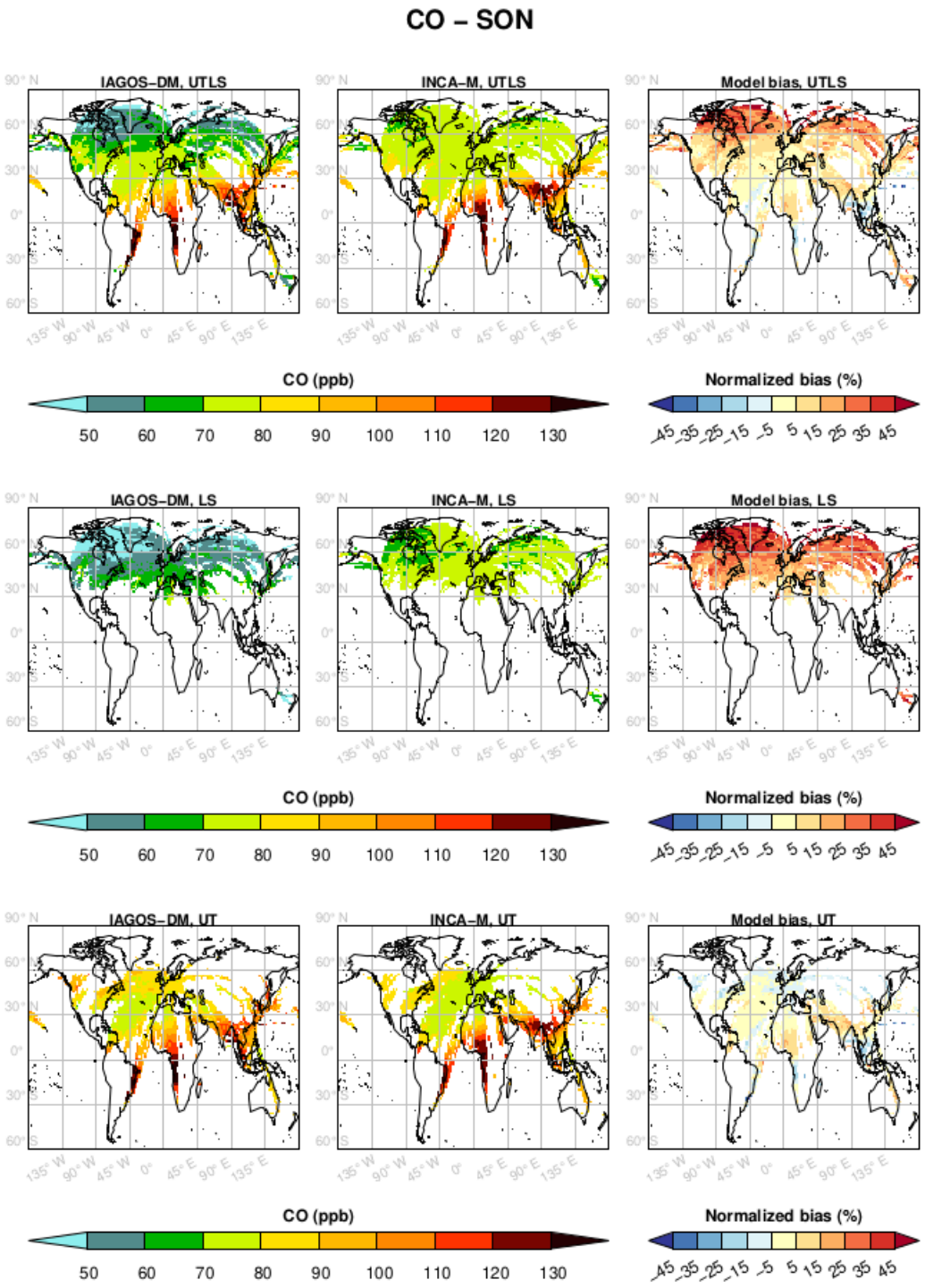

Figure S8. As Fig. S5 for boreal fall.

S3 Reactive nitrogen

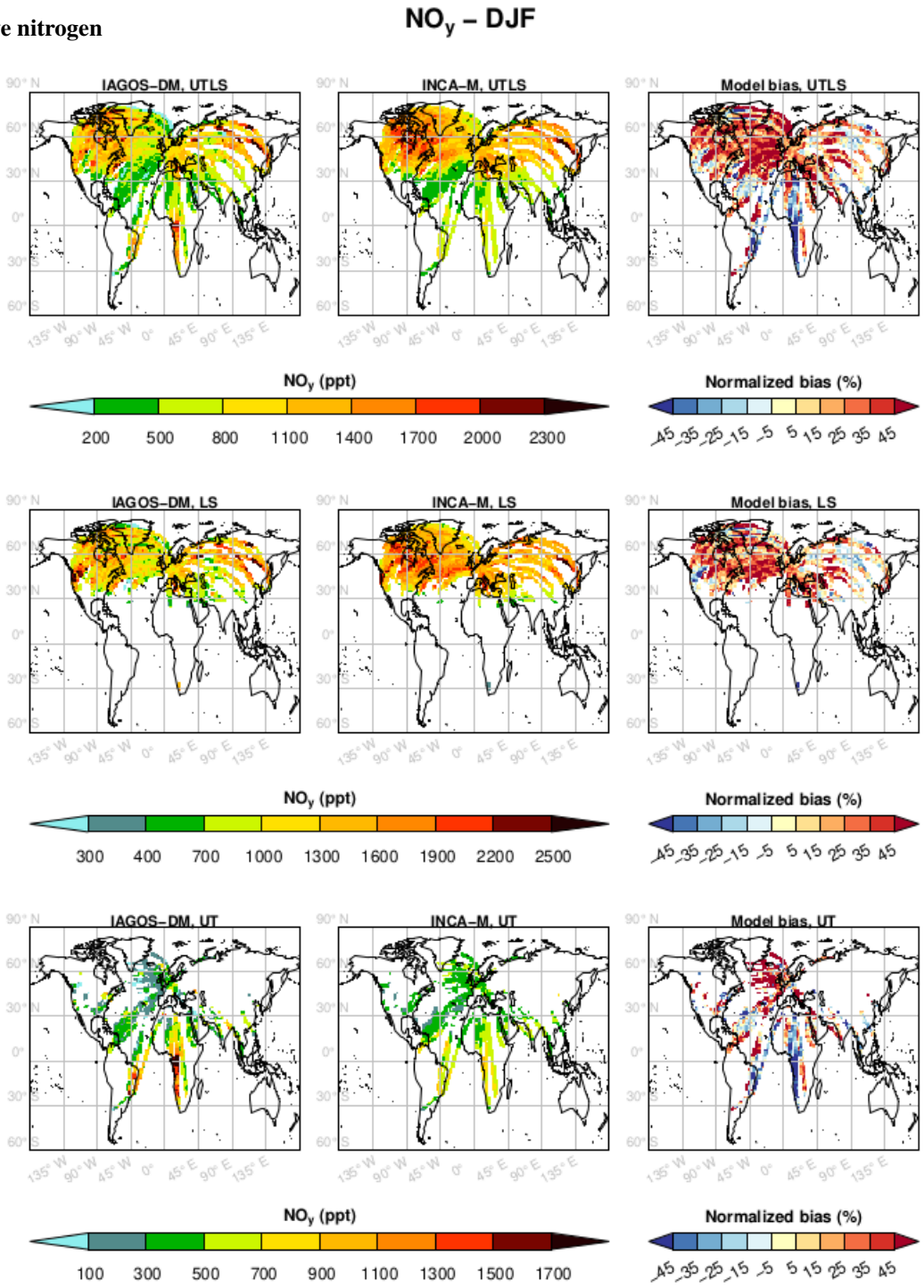

Figure S9. NO_y mean horizontal distributions during boreal winter from the end of 1999 until 2017, for the products IAGOS-DM (left) and INCA-M (middle), and the biases (right) normalized with respect to the mean values between the two products. Each row displays a layer, with the non-separated UTLS at the top and the distinct LS and UT below.

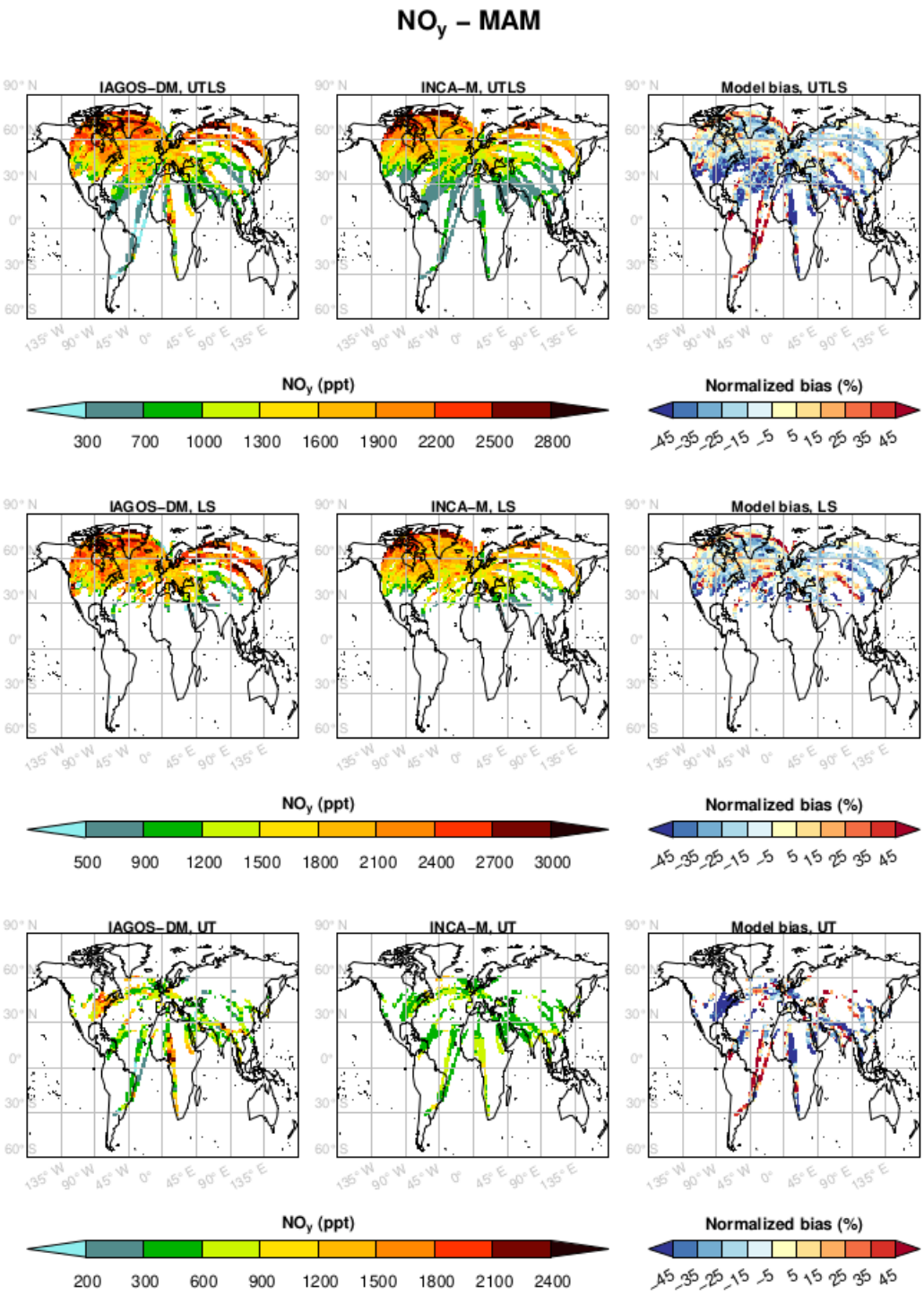

Figure S10. As Fig. S9 for boreal spring.

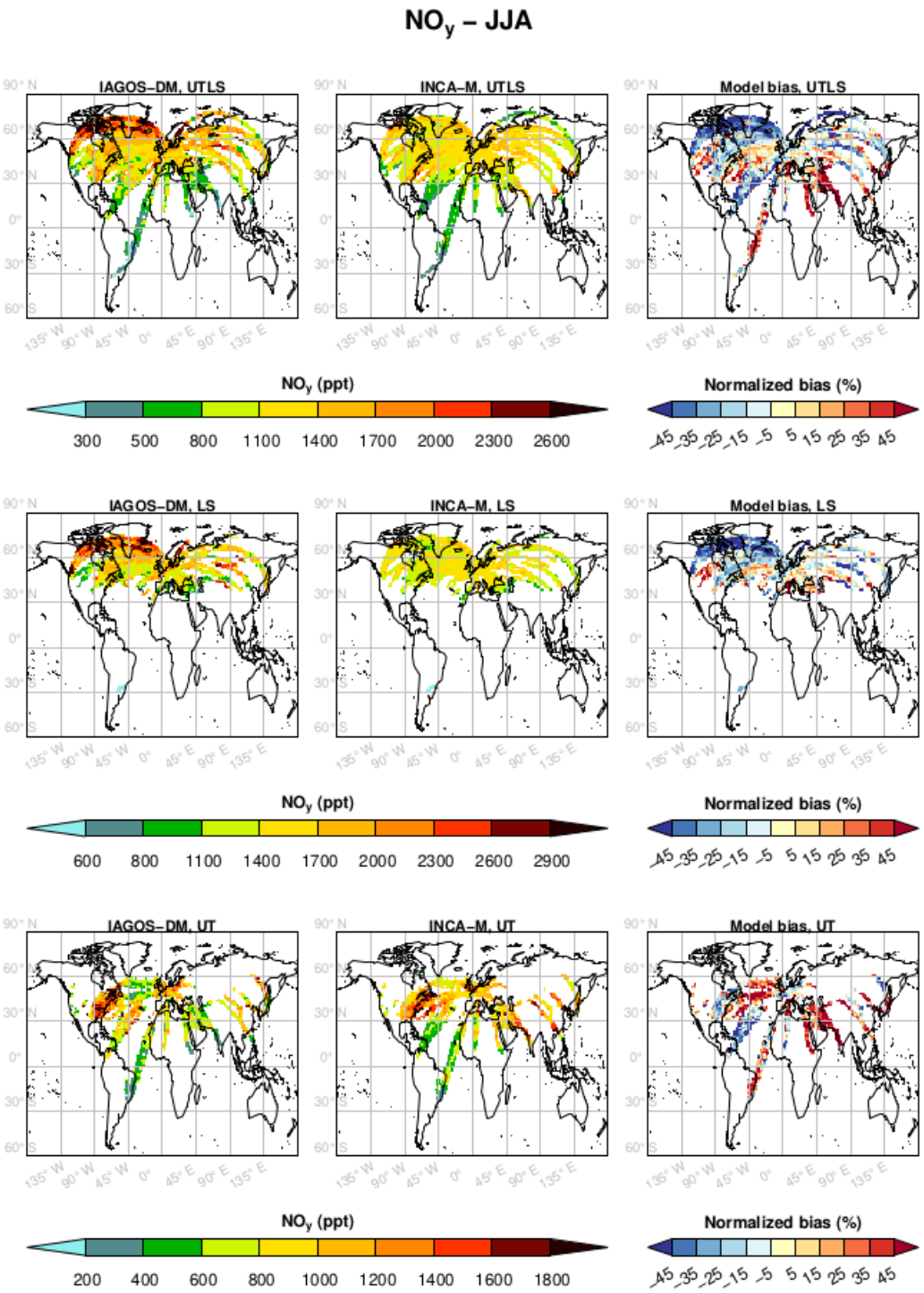

Figure S11. As Fig. S9 for boreal summer.

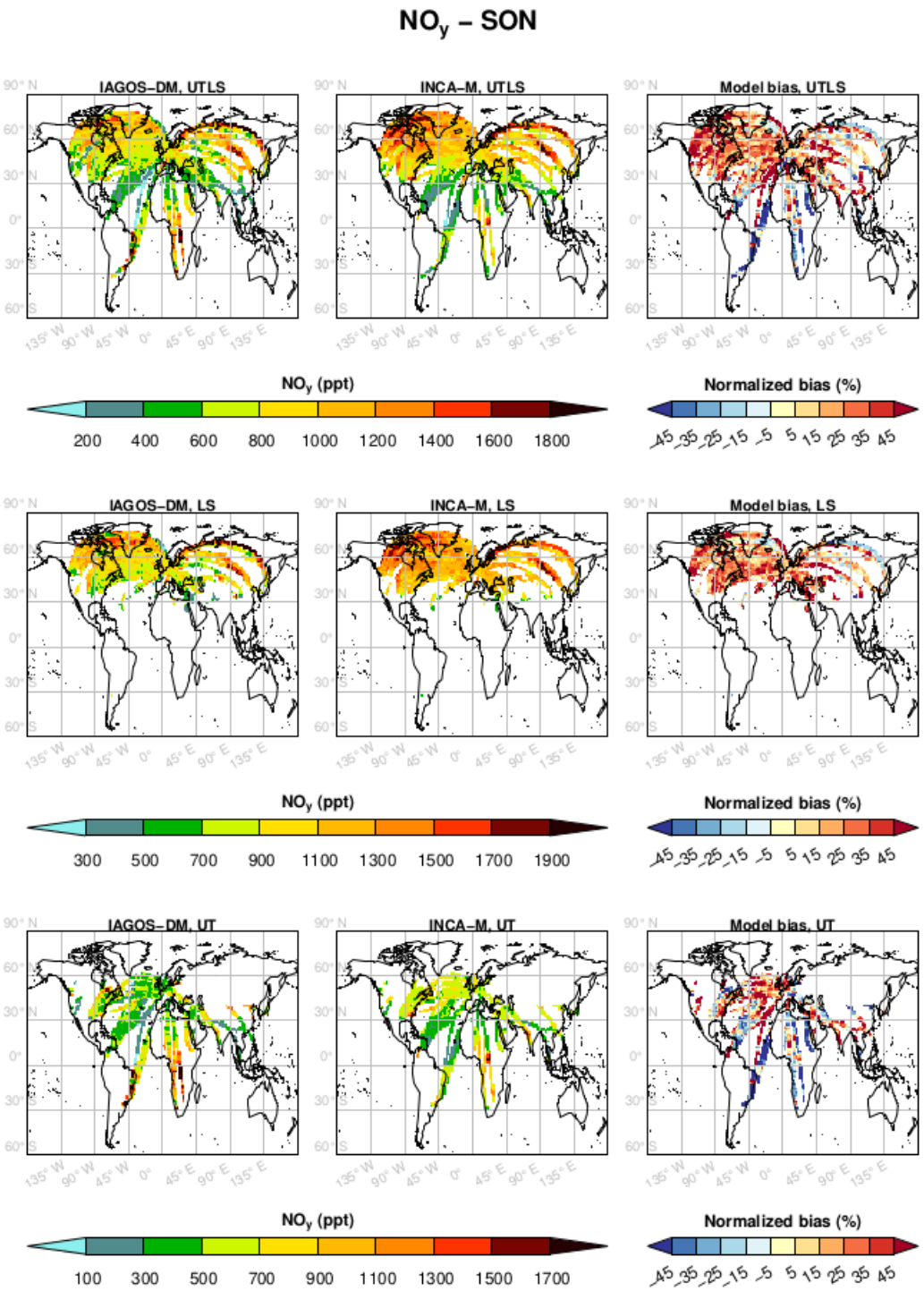

Figure S12. As Fig. S9 for boreal fall.

S4 Water vapour

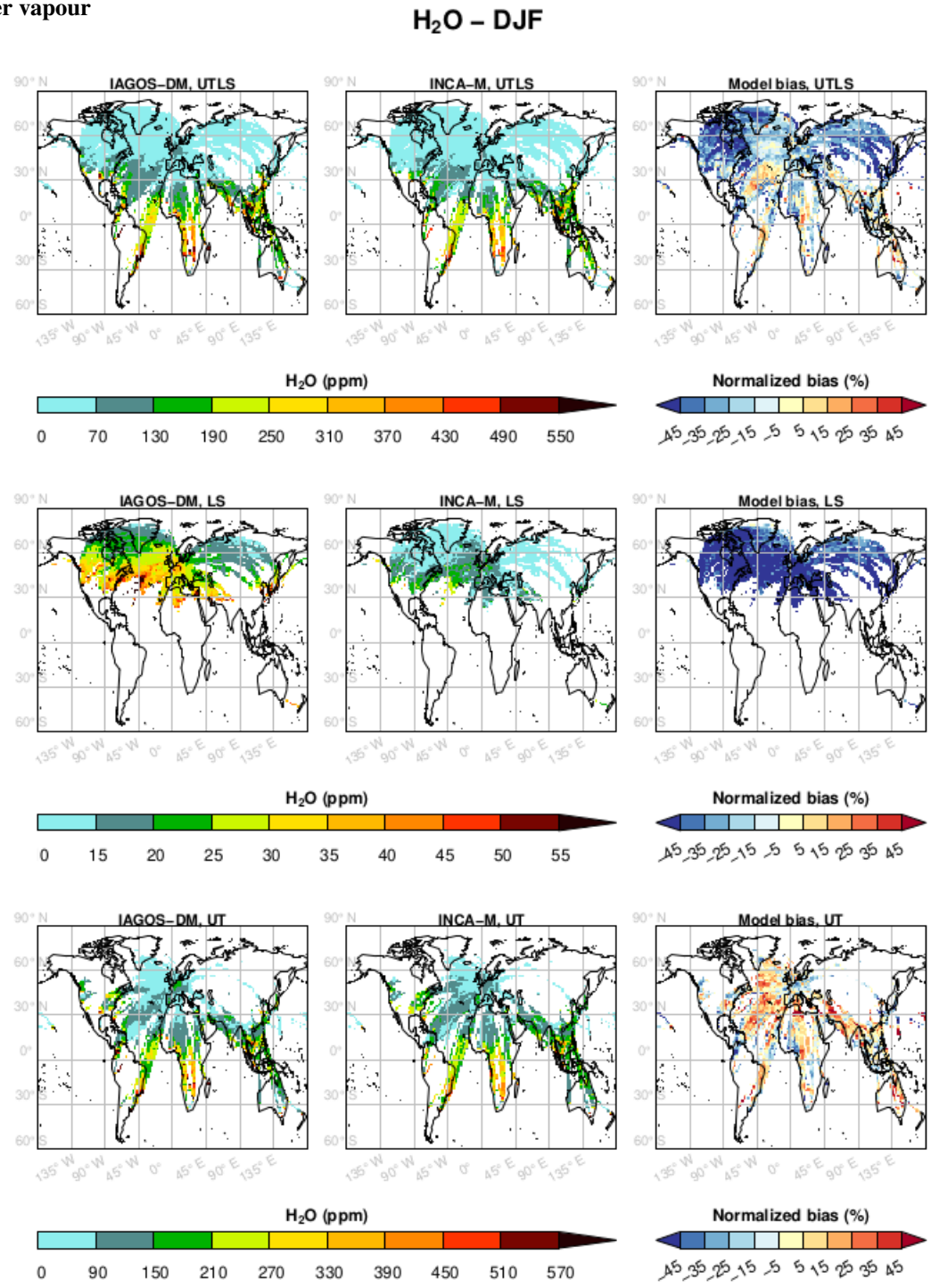

Figure S13. Water vapour mean horizontal distributions during boreal winter from the end of 1994 until 2017, for the products IAGOS-DM (left) and INCA-M (middle), and the biases (right) normalized with respect to the mean values between the two products. Each row displays a layer, with the non-separated UTLS at the top and the distinct LS and UT below. Please note that the LS climatology is representative of lower altitudes than for the other species, as explained in the manuscript.

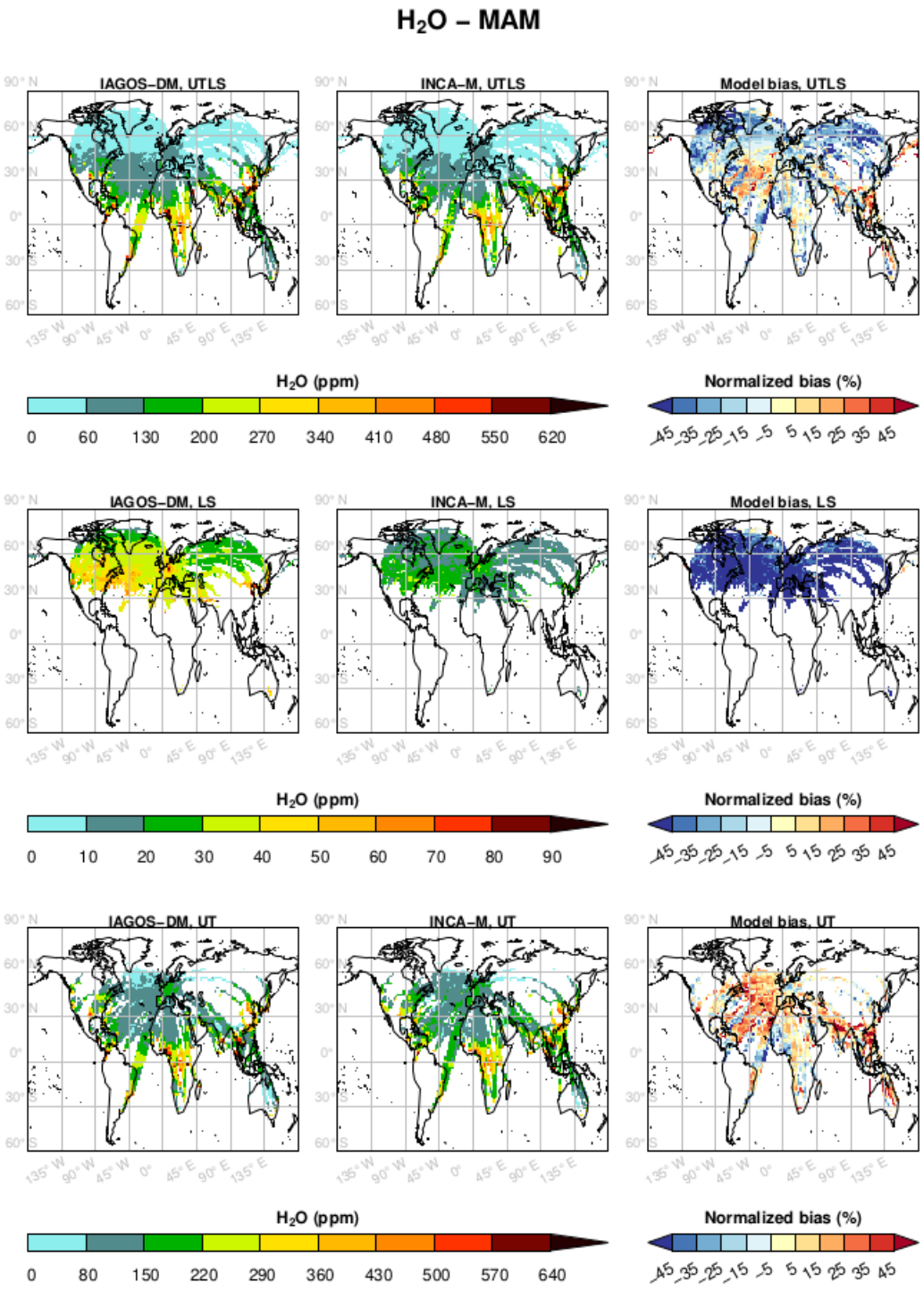

Figure S14. As Fig. S13 for boreal spring.

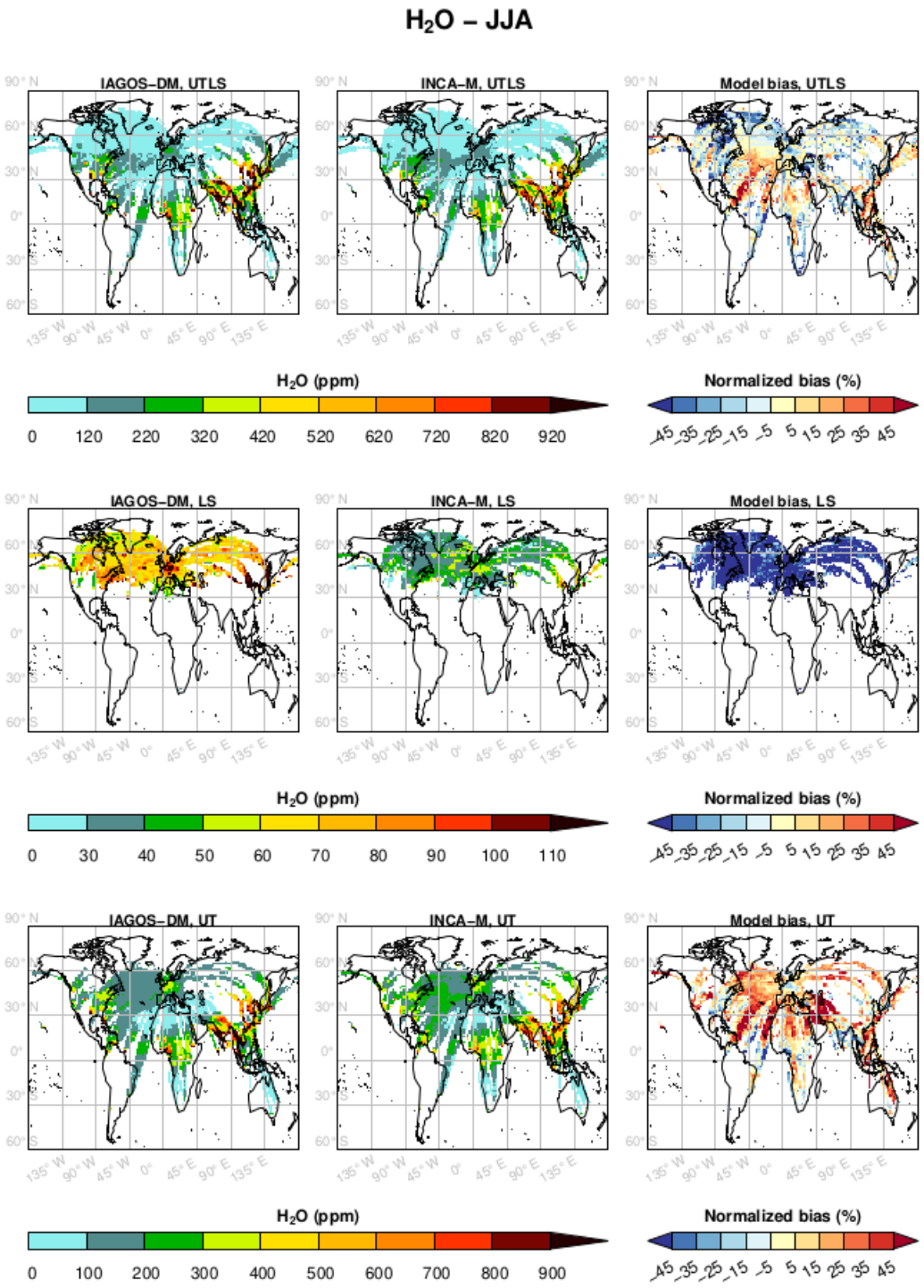

Figure S15. As Fig. S13 for boreal summer.

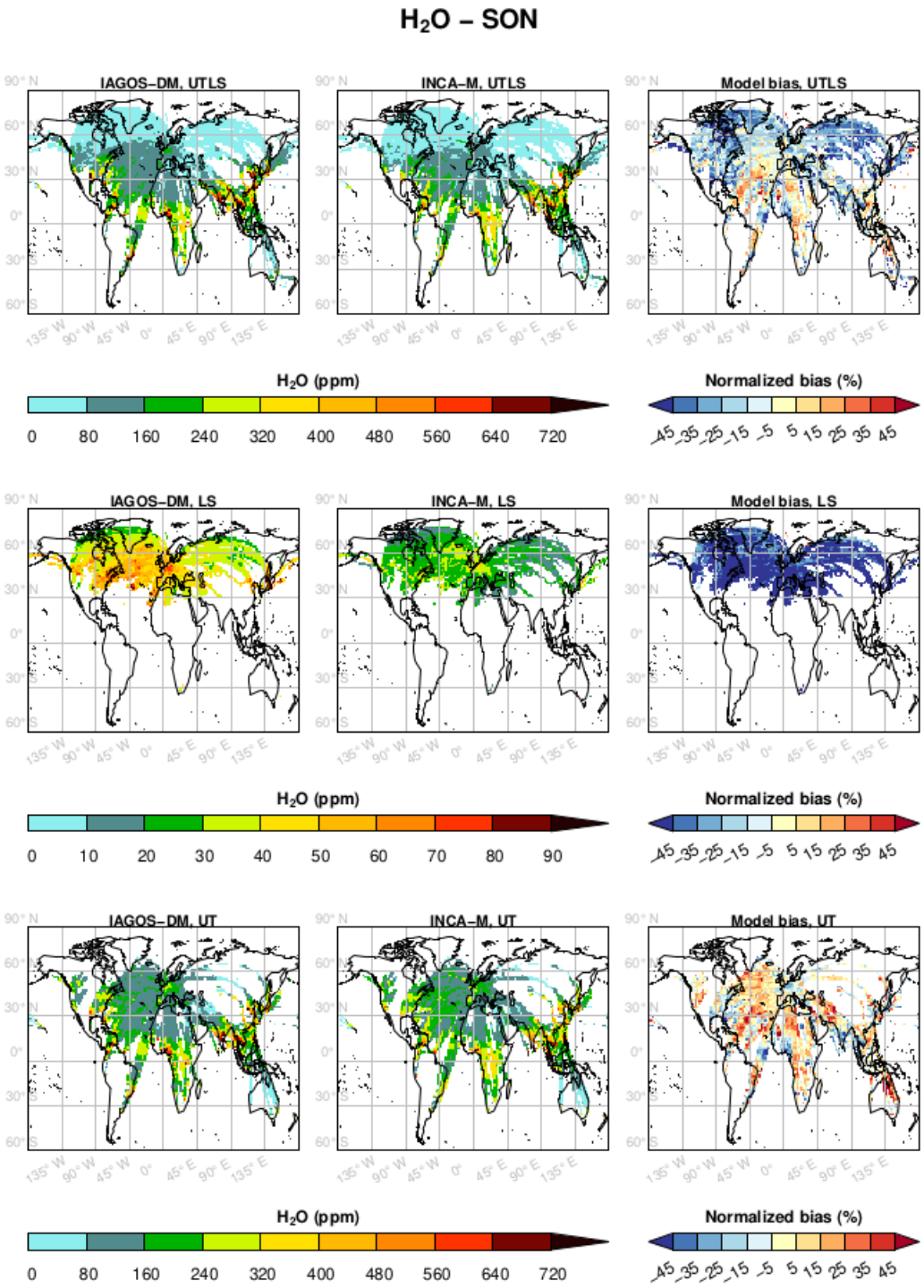

Figure S16. As Fig. S13 for boreal fall.