



The impact of horizontal groundwater flow and localized deforestation on the development of shallow temperature anomalies

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We discuss temperature anomalies that develop in the shallow (< 100 m) subsurface, as a result of localized deforestation in combination with shallow horizontal groundwater flow. Model results show how a patch-wise pattern of deforestation at the surface induces significant lateral temperature gradients in the subsurface. We show that lateral heat transport by heat advection through horizontal groundwater flow becomes significant above flow rates of about 10^{-8} m/s, and can potentially cause temperature anomalies hundreds of meters away from the deforested area. In this scenario, temperature-depth profiles measured up- and downstream of such areas can show contrasting temperature anomalies while having undergone the same history of surface temperature. Results from our model should facilitate the use of subsurface thermal data for the testing of soil schemes in General Circulation Models.