hess-2016-555-SC1

The literature search is not current enough and misses some important recent papers:

L44: This is completely wrong. Read and include the references of Gaj et al., 2017; Oerter et al., 2014, Meibner et al., 2014; Lin and Horita, 2016.

L45-46: Need to include references to support this claim. I suggest the authors read and include citations from Sprenger et al. 2016.

L44-46，"The isotopes of D and 18 O are conservative and do not react with clay minerals and other soil materials. D and 18 O are widelyused to investigate ecological and hydrological processes. Stable isotopes can provide information about mixing, transport processes and residence time of water within a soil profile in the unsaturated zone."

Response: Done. We have added some current papers.

"The isotopes of D and 18 O are conservative and do not react with clay minerals and other soil materials. D and 18 O are widely used to investigate ecological and hydrological processes. Stable isotopes can provide information about mixing, transport processes and residence time of water within a soil profile in the unsaturated zone."

At present, there are already many relevant research findings, as follows:

Carey Gazis , Xiahong Feng ,A stable isotope study of soil water: evidence for mixing and preferential flow paths，Geoderma 119 (2004) 97–111

Barnes, C. J. and Allison, G. B.: Tracing of water movement in the unsaturated zone using stable isotopes of hydrogen and oxygen, J. Hydrol., 100, 143-176, 1988.

Arny, E., Svein, B. D., Hans, C., Steen, L., Thorsteinn, J., Sigfus, J. and Johnsen,: Monitoring the water vapor isotopic composition in the temperate North Atlantic, J. Geop. Res., Abstracts, 15, 2013-5376, 2013.

Busari, M. A., Salako, F. K., Tuniz, C. and Zuppi, G. M.: Estimation of soil water evaporative loss after tillage operation using the stable isotope technique, Int. Agrophys., 27, 257-264, 2013.

Gazis, C. and Feng, X. H.: A stable isotope study of soil water: evidence for mixing and preferential flow paths, Geoderma, 119, 97-111, 2004.

Hooper, R. P.: Diagnostic tools for mixing models of stream water chemistry, Water Resour. Res.,39,

1055, 2003.

Komor, S. C. and Emerson, D. G.: Movements of water, solutes, and stable isotopes in the unsaturated zones of two sand plains in the upper Midwest, Water Resour. Res., 30, 253-267, 1994.

Parnell, A. C., Inger, R., Bearhop, S. and Jackson, A. L.: Source Partitioning Using Stable Isotopes: Coping with Too Much Variation, Plos. One, 5, 9672, 2010.

Phillips, S. J., Anderson, R. P. and Schapire, R. E.: Maximum entropy modeling of species geographic distribution, Ecol. Model, 19, 231-259, 2013.

Busari M.A., Salako F.K., Tuniz C., Zuppi G.M. Estimation of soil water evaporative loss after tillage operation using the stable isotope technique, *Int. Agrophys., 2013, 27, 257-264*

Shen Y. J., Z. B. Zhang, L. Gao, X. Peng. Evaluating contribution of soil water to paddy rice by stable isotopes of hydrogen and oxygen. Paddy Water Environ,DOI 10.1007/s10333-013-0414-y

Pei Zhao, Xiangyu Tang, Peng Zhao,Identifying the water source for subsurface flow with deuterium and oxygen-18 isotopes of soil water collected from tension lysimeters and cores, Journal of Hydrology 503 (2013) 1-10.

Donald L. Phillips.Mixing models in analyses of diet using multiple stable isotopes: a critique, Oecologia (2001) 127:166–170

Rodney A. C, David J. C. Using stable oxygen isotopes to quantify the water source used for transpiration by native shrubs in the San Luis Valley, Colorado U.S.A. *Plant and Soil* 260: 225–236, 2004.

L115: This needs some justification. There must be some discussion (somewhere in the paper, but probably not in the methods section) of the many papers that cite problems with the vacuum extraction process and variability in its results, see

Araguas et al., 1995; Orlowski et al., 2016a; Orlowski et al, 2016b. Details on the vacuum distillation methods need to be included.

References that need to be included:

Araguas-Araguas, L., Rozanski, K., Gonfiantini, R., Louvat, D., 1995. Isotope effects accompanying

vacuum extraction of soil water for stable isotope analyses. J Hydrol,

168: 159-171.

Gaj, M. et al., 2017. Mineral mediated isotope fractionation of soil water. Rapid Communications in Mass Spectrometry, 31(3): 269-280.

Lin, Y., Horita, J., 2016. An experimental study on isotope fractionation in a mesoporous silica-water system with implications for vadose-zone hydrology. Geochimica et Cosmochimica Acta, 184: 257-271.

Meißner, M., Köhler, M., Schwendenmann, L., Hölscher, D., Dyckmans, J., 2014. Soil water uptake by trees using water stable isotopes (2H and 18O) a method test regarding soil moisture, texture and carbonate. Plant and Soil, 376(1-2): 327-335.

Oerter, E. et al., 2014. Oxygen isotope fractionation effects in soil water via interaction with cations (Mg, Ca, K, Na) adsorbed to phyllosilicate clay minerals. J Hydrol, 515:1-9.

Orlowski, N., Breuer, L., McDonnell, J.J., 2016a. Critical issues with cryogenic extraction of soil water for stable isotope analysis. Ecohydrology, 9: 3-10.

Orlowski, N., Pratt, D.L., McDonnell, J.J., 2016b. Intercomparison of soil pore water extraction methods for stable isotope analysis. Hydrol Process, 30(19): 3434-3449.

Sprenger, M., Leistert, H., Gimbel, K., Weiler, M., 2016. Illuminating hydrological processes at the soil - vegetation - atmosphere interface with water stable isotopes. Reviews of Geophysics.

Response: Water was extracted from soil, leaf, branch, xylem and root by cryogenic vacuum distillation method. The moisture in the soil or plants under the condition of vacuum (vacuum below60MT), was heated by heat set to 105 ℃ after evaporation. Water vapor of evaporation in -50 ℃ (liquid nitrogen) was collected with frozen water collecting pipe (top-down frozen, in order to increase the collecting rate), and the precision extract of δD and δ^{18} are ±3‰ and ±0.3‰, respectively.

The vacuum extraction has been well employed in many research works, as follows:

Yonggang Yang, Honglang Xiao , Zuodong Qin， Songbing Zou, et al. Hydrogen and oxygen isotopic records in monthly scales variations of hydrological characteristics in the different landscape zones [J].Journal of Hydrology, 2013,499:124~131.

Yonggang Yang, Honglang Xiao , Songbing Zou, et al. Hydrological processes in the different

landscape zones of alpine cold regions in the wet season, combining isotopic and hydrochemical tracers[J]. Hydrological Processes, 2012, 25: 1457~1466.

Yonggang Yang, Honglang Xiao , Songbing Zou, et al. Hydrologic processes in the different landscape zones in the alpine cold region during the melting period [J]. Journal of Hydrology, 2011, 409:149~156.

West AG, Patrickson SJ, Ehleringer JR.Water extrac-tion times for plant and soil materials used in stable isotope analysis. Rapid Commun Mass Spectrom (2006)20: 1317–1321

EhleringerJR, OsmondCB. Stableisotopes.In:PearcyRW, Ehleringer JR, Mooney HA, Rundel PW (eds) Plant physio- logical ecology: Field methods and instrumentation.Chapman and Hall, New York, (1989).pp 281–300

Carey Gazis , Xiahong Feng ,A stable isotope study of soil water: evidence for mixing and preferential flow paths，Geoderma 119 (2004) 97–111

Rodney A. C ， David J. C, Using stable oxygen isotopes to quantify the water source used for transpiration by native shrubs in the San Luis Valley, Colorado U.S.A. Plant and Soil. 2004.260: 225–236,

Meik Meißner ， Michael Köhler ， Luitgard Schwendenmann， Dirk Hölscher ， Jens Dyckmans, Soil water uptake by trees using water stable isotopes (δ2Hand δ18O)—a method test regarding soil moisture, texture and carbonate Plant Soil .2014. 376:327–335

Stumpp. C. , Maloszewski，Stichler P W. , Fank. J.Environmental isotope (d18O) and hydrological data to assess water flow in unsaturated soils planted with different crops: Case study lysimeter station“Wagna” , Journal of Hydrology 369 .2009：198–208

Xianfang Song, Shiqin Wang1, Guoqiang Xiao, A study of soil water movement combining soil water potential with stable isotopes at two sites of shallow groundwater areas in the North China Plain Hydrol. Process. 2009.23, 1376–1388.