

Interactive  
Comment

## ***Interactive comment on “Aeolian nutrient fluxes following wildfire in sagebrush steppe: implications for soil carbon storage” by N. J. Hasselquist et al.***

### **Anonymous Referee #2**

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The authors evaluate the role of aeolian sediment transport in the biogeochemical cycling of C and N following wildfire in a semiarid sagebrush steppe ecosystem. Their findings suggest that episodic pulses of aeolian transport following fire can affect the spatial distribution of soil C and N within these systems and can result in increased horizontal nutrient fluxes. The study provides new insights on the ecological importance of aeolian processes in the biogeochemical cycling of C and N. Overall, the manuscript is well-written and appears to provide sufficient field-based measurements to support the main conclusions presented by the authors. I have a few specific comments that the authors may wish to consider when revising the manuscript.

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Interactive Discussion

Discussion Paper

Rates of aeolian transport were estimated using BSNE samplers, which provide good estimates for coarser, saltating-sized particles but are considerably less efficient at capturing finer, suspension-sized particles. Although C and N concentrations in this study were actually greater on the coarser particles relative to the finer particles, the coarser particles are likely associated with local redistribution at small scales (i.e., several meters) and thus may not represent an important source of nutrients to downwind unburned areas. What fraction of the observed nutrient flux actually leaves the burned site compared to local redistribution? Were any measurements of aeolian deposition made in the burned and unburned areas? Is there a prevailing wind direction at the study site? As the authors point out in the manuscript, horizontal nutrient fluxes do not directly quantify the amount of nutrient lost per unit ground area. Estimates of C and N lost from the burned area based on soil erosion bridges may overestimate losses due to aeolian transport, as fluvial transport likely accounts for a considerable fraction of the mean rate of surface deflation (2.1 mm yr<sup>-1</sup>). Were any large rainfall events observed during the first few months following the fire?

Mean estimates of horizontal C and N fluxes for the different particles size classes (Fig 4) seem to suggest that most of the differences between the burned and unburned sites were detected only in the saltation size class. Horizontal C and N fluxes in the suspension size class did not differ between the burned and unburned areas during the study period. If more nutrients were being lost from the burned area, I would expect to see a significant increase in C and N fluxes in the suspension size class; however, this was not observed. Only particles in the suspension size class are likely to travel the >1 Km distance between the BSNEs in the burned and unburned areas. How are nutrients lost from the burned area at a greater rate than from the adjacent unburned area if no significant differences were detected in horizontal C and N fluxes in the suspension class?

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