

## ***Interactive comment on “Fungal loop transfer of N depends on biocrust constituents and N form” by Zachary T. Aanderud et al.***

**Trent northen (Referee)**

trnorthen@lbl.gov

Received and published: 10 January 2018

Aanderud et al simulated rainfall events including 15N to test the nitrogen portion of the fungal loop hypotheses in biological soil crusts. Focusing on the flow of nitrogen from biocrusts as mediated by fungi. These are very important systems and it is very important to gain insights into nutrient cycling. They added either 15N ammonia or nitrate to the biocrust and measured the resulting isotope distribution in the surrounding biocrusts and grass after 24 hours. In addition, they assessed the fungal community structure and also used qPCR to assess the biomass contributions of the major fungal community members. Overall, this is a well written and interesting manuscript addressing an important hypothesis.

C1

Major comments:

-It would be helpful to include figure showing the layout of the experiment. Along these lines, might be nice to include photos of plots and types of biocrust as supplemental material

-It is a bit surprising that no tracer is found in the plant, presumably because the plants didn't wake-up with the small wetting event as you suggest. Since this is an important component of the loop hypothesis it would be worth adding additional discussion esp. on what is known about the intensity of rainfall required for plants to become active.

Minor points:

- line 59: consider specifying that they are 'terrestrial' cyanobacteria since you haven't introduced biocrusts yet

- lines 88-92: Hard to follow

- line 149: What are the molar concentrations of  $K^{15}NO_3$  and  $(^{15}NH_4)_2SO_4$  used?

- line 169: should be isotope 'ratio' not ration

- lines 327-328: "mosses" appears twice

Was biocrust isotope enrichment analyzed at 0 cm radial distance (at the application point)? This would be a good comparison to even see how much of the label actually remained in the soil ( $NH_4^+$  vs  $NO_3^-$ ).

To further understand the role of fungi in nutrient transport, it would be interesting to see what form the N is in at the various locations from the site of application. Though I expect this would be future research.

---

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2017-433>, 2017.

C2