EEB 4609W/5609
Workshop on Synthesis and Working with Sources: Writing Samples

Paragraph #1

Fire significantly increases soil ammonium and nitrate pools, and reduces fuel nitrogen amount (Wan et al. 2001). Increases in ammonium and nitrate, after a fire, are caused by pyrolysis of organic matter, an increase of N mineralization, and the leaching of N from the forest floor into the soil. The increased rates of N mineralization post-fire are due to a decrease in the carbon to nitrogen ratio. Nitrification also increases initially post-fire. After a while both ammonium and nitrate decrease as N-fixation increases. N-fixation is the main pathway by which new nitrogen enters terrestrial ecosystems (Chapin III et al. 2002). Ammonium adsorbs on negative charges of mineral and organic surfaces, but with time is destined to be biogeochemically transformed to nitrate, which is leached soon if not taken up (Certini, 2005). The soil ammonium pool increased approximately twofold immediately after fire, but gradually decreased to the pre-fire level after just one year (Wan et al. 2001). In contrast, nitrate saw a small initial increase initially, then reached a maximum level of roughly threefold of the pre-fire level within the first six months to a year after the fire, and then declined (Wan et al. 2001). Fire effects on ammonium and nitrate availability, the changes by fire that affect the plant communities and the direct effects of fire on plant communities are three factors that illustrate the effect of forest fires on nitrogen availability of nitrogen to plants in boreal forests.

Paragraph #2

The issue of potential impact on species richness under potential climate change conditions has largely been examined in alpine regions (Moen et al. 2008). Furthermore, a paper examined potential outcomes of species richness in Europe (Thuiller et al. 2006). However, the boreal forest of North America is also receiving attention in modeling distribution of tree species (McKenney et al. 2007). In addition, vegetation changes were modeled for northern Alaska in relation to climate change conditions (Euskirchen et al. 2009).

Paragraph #3

The potential damage to photosynthetic capacity by ultraviolet radiation (UVR) can happen in a variety of ways. UVR can damage proteins and nucleic acids by denaturing the bonds within the structures. It also has the capacity to affect chlorophyll, which is essential to photosynthesis, and even the cell walls of an organism (Hazzard et al. 1997). Chlorophyll production can be disrupted through indirect harm to the membrane of the chloroplast (Sobrino et al. 2008). Photosystem II (PSII) can be damaged by creating imbalances in energy throughout the photosynthetic apparatus because the organism cannot as effectively "assimilate energy absorbed through photochemical processes" (Sobrino and Neale 2007). Because the light reaction of photosynthesis, the step involving PSI and PSII, is essentially a series of electron transport mechanisms, if PSII is unable to use, or assimilate the energy absorbed into it, the reduction state of PSII compared to the rest of the photosynthetic apparatus is affected as charge builds up. Additionally, when UVR reacts with oxygen it can produce various radicals such as OH^- which are harmful and can cause damage to cellular structures (Hazzard et al. 1997). The mechanisms by which UVR can inhibit photosynthesis are numerous and this makes it particularly harmful.