**Appendix S6 results – differences between the low and the high disturbance**

The following are the results of both low and high disturbance regimes combined. Unless stated otherwise, the results apply to both regimes. Weak trends are not included to make the comparisons between levels easier to understand. At the meta-ecosystem level, resource flow effects were mediated by patch size asymmetry, as resource flow increased α-diversity, decreased β-diversity, and decreased meta-ecosystem biomass in SLLS but not in MMMM (but at low disturbance resource flows increased meta-ecosystem function in MMMM but not SLLS). Resource flow had no effects on γ-diversity.

At the local level, small ecosystems that were connected to large ecosystems had higher diversity and biomass than when unconnected (SL vs S), as being connected to a large patch benefitted diversity and biomass (SL vs SS) (although for biomass this was only through the size of the connected patches in high disturbance). Also at the local level, large ecosystems that were connected to small ecosystems were either similar in biodiversity and lower in biomass through the size of the connected patch (high disturbance) or had less biodiversity (but no evidence for the size of the connected patch) and similar biomass (low disturbance) than when unconnected (LS vs L). Finally, in medium ecosystems we observed no effect of the connection on biodiversity but an increase in biomass in the low disturbance (MM vs M).

Finally, at the local level, unconnected larger ecosystems had a higher ratio of autotrophic individuals to heterotrophic individuals in the high but not low disturbance (S vs M vs L).