Ecological effects of El Niño in terrestrial ecosystems of western South America

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Abstract

I make a summary review of how El Niño/Southern Oscillation (ENSO) determines peculiar atmospheric and oceanographic conditions in western South America, thus affecting precipitation patterns in adjacent land masses, with cascading effects on marine and terrestrial plants, on sea and land birds, and on marine and terrestrial mammals. With regard to terrestrial ecosystems, I discuss the following biotic responses to El Niño-driven precipitation: 1) aboveground vegetation flushes immediately among herbs but not among shrubs. 2) The seed bank is quickly replenished of ephemeral seeds, but perennial seeds recover one year later. 3) Small rodents Irrupt within months of El Niño arrival, but larger ones take a full year to increase. 4) Predator numbers lag one year behind their mammal prey, with smaller predators responding more quickly. Considering these responses, I offer a simplified model of El Niño-driven bottom-up control in terrestrial ecosystems of western South America. Apart from the direct links already described, there is a weak feedback loop between the plant compartments (vegetation and seeds) and their herbivores: primary productivy is the driving force, and is little affected by herbivory. Another weak feedbaek loop links herbivores and their predators: the latter seem to just “surf” over prey levels, skimming excess prey.