ONSET OF THE HOMOGEOCENE IN SOUTHERN AFRICA

Widespread invasion by exotic species, cultivation of introduced crops, urbanization and disruption of ecosystems has caused the demise of the Holocene and ushered in the Homogeocene.

by ***Francis E. Putz****, Centre for International Forestry Research, Harare, Zimbabwe*

Previous transitions between geological eons, eras, periods, and epochs were always marked by massive global changes such as the split up of the supercontinent Pangea, the onset of widespread glaciation or giant meteorite-induced faunal and floral changes. Not so for the transition from the Holocene to the Homogeocene, an epoch recognized by marked losses of biodiversity and homogenization of the world's plants, animals, landscapes and cultures. Although the planet is rapidly warming, the biotic 'uniformization' marking the start of the Homogeocene began before climate change was detectable. The Homogeocene also seems peculiar insofar as it began, is beginning, or will soon begin at different times in different parts of the world, depending on the activities of one species – *Homo sapiens*.

On the basis of pollen deposited and stored annually in sediments on the bottom of lakes, and archaeological evidence, the harbingers of the Homogeocene in southern Africa might be detected about 2000 years ago with the introduction of sheep, or slightly later when grains from northern Africa and the Middle East began to be cultivated. Early residents in southern Africa also undoubtedly modified fire regimes in the region, but the changes that they caused were modest compared with the ecosystem – transforming activities of European colonists. By the mid-1600s, most arable lands around the Cape were covered by crop species introduced from elsewhere in the world. In the early 1800s, the fynbos (a near casualty of the Homogeocene) was already beleaguered by exotics. But because the rates and magnitudes of environmental change witnessed by southern Africa increased substantially at the time of the diamond boom of the mid-1800s, I would suggest 1870 as the onset of the Homogeocene in the region.

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Although there are apparently no written descriptions of what it was like during the Cretaceous-Tertiary transition, or even what it was like at the end of the Pleistocene, the Holocene-Homogeocene transition seems peculiar insofar as it is occurring at different times in different places. Perhaps the problem is one of time perspective: were we looking back on this transition from a vantage point ten thousand or ten million years in the future, and interpreting the changes from pollen records, the rate of ecosystem disruption would undoubtedly appear nearly instantaneous. But perhaps we can learn something by contemplating the question of why some ecosystems and some regions seem particularly susceptible to Homogeocenic change.

Given that we are responsible for most of the changes being wrought on our small planet, it seems as if we should also be able to predict which of the species we move around the globe are likely to be 'invasive' and where they are likely to invade. Unfortunately, other than recognizing that species that have proven to be invasive in one region are likely to be invasive in another, we have a long way to go to predict 'invasiveness' from first principles. Likewise, the susceptibility of ecosystems to invasion has also proven an illusive concept. For a while ecologists were confident that biological 'fabric' of natural ecosystems was tight enough to protect them from invasive species and that 'disturbance' was a necessary prerequisite for invasion. Given the rapid, obvious, and financially costly invasion of cultivated ground by cosmopolitan weeds, this belief is understandable. Nevertheless, invasion of intact fynbos was recognized with alarm more than 100 years ago, but apparently the idea of 'balance of nature' dies hard. Now some of us are even confused about what constitutes a 'disturbance' in an ecosystem. For example, how can fire and lack thereof both represent disturbances? And how do we distinguish between natural and human-induced disturbances? People have been playing with matches (or the equivalent) in southern Africa for at least 1.5 million years: were the fires that Stone Age people started 'natural'? In light of the continuous presence of humans in this region for so long, it would help to know the extent to which they shaped the ecosystems that we are desperately trying to maintain. But should we mimic the disturbance regimes that they set in motion, or rely solely on lightning to ignite our management fires?

One of the other problems in recognizing potentially invasive plant species is that many successful invaders start out seeming innocuous and often attractive. For many generations they may be cultivated in gardens without any apparent tendency to escape. Many of the most insidious invaders of natural ecosystems are slow growing, shade tolerant, and pest resistant, all traits that are desirable in horticultural species. Then, when its invasive nature is revealed and environmentalists sound the alarm, they often meet resistance from gardeners and the nursery industry. It is clear that environmental education efforts focusing on the threat of exotic invasive species need to be supported lest the ravages of the Homogeocene come on faster than anyone would like.

Even with continued habitat fragmentation, fire suppression in pyrogenic ecosystems, frequent burning of ecosystems where fire never before played a major ecological role, introduction of more and more exotic species and suspension of the gallant efforts at protecting nature preserves from being overwhelmed, the vegetation of southern Africa will never be completely homogeneous. But who wants to go on outings in southern Africa to walk through forests of Australian eucalypts, American pines, Asian willows or European poplars?

The world has a lot to learn from southern Africa about the Homogeocene and how its effects can be mitigated or avoided by ecosystem management, including bio-control of exotic invasive species. Given that many of the species that threaten us with ecological monotonoy are commonly cultivated in suburban gardens, anti-Homogeocene efforts can be started in our own backyards.

About the author

Professor Francis E. Putz took sabbatical leave from the University of Florida to work on a miombo management project run by the Centre for International Forestry Research based in Harare, Zimbabwe. He has been impressed by the obvious devotion of many people in the region to protecting the natural environment and by the many challenges that they face.