Is the airborne fraction of anthropogenic CO₂ emissions increasing?

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Several recent studies have highlighted the possibility that the oceans and terrestrial ecosystems have started losing part of their ability to sequester a large proportion of the anthropogenic CO₂ emissions. This is an important claim, because so far only about 40% of those emissions have stayed in the atmosphere, which has prevented additional climate change. This study re-examines the available atmospheric CO₂ and emissions data including their uncertainties. It is shown that with those uncertainties, the trend in the airborne fraction since 1850 has been 0.7 ± 1.4% per decade, i.e. close to and not significantly different from zero. The analysis further shows that the statistical model of a constant airborne fraction agrees best with the available data if emissions from land use change are scaled down to 82% or less of their original estimates. Despite the predictions of coupled climate-carbon cycle models, no trend in the airborne fraction can be found.

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