

Steve Running NPP Audiofile
TRT 3:40

Net primary production is effectively plant growth. And so we are monitoring plant growth of the entire planet, every square kilometer, everyday, all year long. The value of this is to be able to analyze the state of this part of the carbon cycle, the health of the biosphere and this really becomes a very fundamental measure of global habitability.

Net primary production is where CO₂ is absorbed from the atmosphere and turned into plant biomass. Now we care about net primary production also, because it is a measure of the carbon sink that slows down the increase of atmospheric CO₂. So we know that the terrestrial biosphere absorbs about a quarter of the fossil fuel emissions every year. And so it very directly slows down global warming by slowing down the increase of atmospheric CO₂.

In our earlier paper in 2003, the Nemani et.al. science paper, we found that from 1982 to 1999 that global terrestrial net primary production had gone up about 6% over those 18 years. And our previous trend from the earlier paper would suggest that primary production would have been enhanced even more because of even warmer temperatures, particularly lengthening the growing season of energy and temperature-limited ecosystems. And so the working hypothesis, so to speak, was that primary production would accelerate another 4 or 5% over the last decade. But what we found instead is that net primary production has now gone down. Not a great deal, only 1%, but the important thing is that the previous decades were strongly positive and this is now turned negative, a trend in this last decade.

Now, if we had perfect models of the global system, we could project into the future whether these negative trends of land and ocean productivity will continue. And I think it's really quite premature to suggest that our models are that good, and so this is really precisely where global earth system monitoring is the only way that we're going to be able to answer the question of whether these trends are now documented as terrestrial NPP continue to go down, does the decline accelerate even faster, or does it trend back up and reach a positive trend? We really don't expect it to trend back up unless there's dramatic increase in regional rainfall rates worldwide, because droughts is what's causing this trend to go negative. And so we really have absolutely the requirement to continue this type of global monitoring if we're going to know 10 years from now whether the next decade continues this negative trend or does something different.