Emissions Scenarios and Representative Concentration Pathways Reflection

# Summarize the Emissions Scenario: Storylines Approach

Emissions scenarios are hypothetical future timelines that depict what emissions could look like moving forward and how that would affect global climate change. In the storylines approach, the climate change prediction community has created several narratives of changes or continuations of socio-economics, demographics and population, energy resources, technology, policy, and more. From these hypothetical narratives, potential emissions were calculated and then studied for their climate change effects. It is important to note that none of these narratives are more likely than the others to occur. This was simply a survey of possibilities that are open to us at the current moment in time.

# Summarize the SRES families: the four families (A1, A2, B1, B2) in detail

The storylines approach was taken by the Intergovernmental Panel on Climate Change and published in their Special Report on Emission Scenarios. This report categoried the narratives discussed in four categories or familes, which is why they are referred to as the SRES familes. Each family is given a letter, A or B, to refer to whether the narrative focuses more on economic or environmental action, respectively. Each is also given a letter, 1 or 2, to determine whether they require more global cooperation or local action, respectively. Therefore, the four families are A1, which is sometimes referred to as the “business as usual” approach with more global cooperation but economic factors outweigh environmental ones in decision-making, A2 with economic emphasis but reduced global cooperation, B1 with continued global cooperation and a shift towards environmental consciousness, and B2 with a discontinuation of global cooperation but a shift towards environmental consciousness. Note that there are also subcategories that are noted by B, a balanced energy production, F1, fossil fuel intensive energy production, and T, non-fossil fuel energy production.

# Summarize the Radiative Forcing Approach

The radioactive force approach takes the opposite direction of the SRESes. Instead of creating a narrative that then defines the potential emissions, this approach looks at caps for the amount of radioactive forcing in watts per square meter that would be caused by the year 2100. Then, after calculating the numbers, the approach allows for discussing human action (or inaction). These scenarios have been collated into four representative concentration pathways (RPCs), each of which has a number following that corresponds to the radioactive forcing by 2100. In the first, RPC8.5 shows continued growth of emissions through the year 2100. This is often termed the “business as usual” pathway. RPC6 and RPC4.5 are “middle of the road” options where each stabilizes after 2100, just at different levels. Finally, RPC2.6 peaks before 2100 and then declines. This pathway is sometimes called RPCPD for RPC Peak and Decline.

There are also Extention Concentration Pathways (ECPs) that move the endpoint out to 2300. However, many experts are skeptical of how useful these are because, as with any prediction, the further out it is, the less likely it is to be accurate. Also, RPCs take into account the emissions, agricultural area and use, and air pollution. This means that they take several things into account but that they are vulnerable to the random variables that life often throws out without warning. For instance, the COVID-19 pandemic and the Russian invasion of Ukraine were not things that could have been accounted for by RPCs, but most certainly affect the variables that RPCs are based on.