



Climate change scenarios

Worksheet: Regional differences in warming

Climate politics declared an increase of the global mean temperature of more than 2 °C compared to the pre-industrial temperature as a 'dangerous change in climate' that, if possible, should be avoided. In the following, we will investigate at what point the two-degrees target for the global mean and for individual regions is exceeded in the scenarios RCP8.5 and RCP2.6. In addition, we will analyse the consequences of crossing this threshold for the sea level rise. For this purpose, choose the tool ,**compare two scenarios**' (left side) on the page ,**Climate change scenarios**'.

Exercises:

1. At what point is the two-degrees target exceeded in both scenarios?
 - a. RCP8.5:
 - b. RCP2.6:
2. Run both scenarios until 2050 and 2095 and answer the questions in the table below.

	Exercise/ Scenario	RCP8.5	RCP2.6
(1)	Which regions display a warming of more than 2 °C until 2050 in the scenarios RCP8.5 and RCP2.6?		
(2)	What are the consequences of the observed warming for the sea level? Keep in mind that regional differences in the warming exist, and consider the consequences for the sea ice melt and the thermal expansion of the ocean.		
(3)	How do both scenarios differ at the end of the 21st century and what are the consequences with regard to the sea level rise?		

3. Compare the CO₂-concentration of the scenarios displayed in the figures on the left side and answer the questions in the table below.

	Exercise/ Scenario	RCP8.5	RCP2.6
(1)	At what point is the respective maximum of the CO ₂ -concentration met and how high is it?		
(2)	At what point throughout the Earth's history was the CO ₂ -concentration similarly high as the maxima of the scenarios RCP8.5 and RCP2.6 in the 21st century and how warm was it at the respective time? (See articles below!)		
(3)	CO ₂ remains in the atmosphere over long timescales. What are possible measures in order to decrease the CO ₂ -concentration starting in the middle of the 21st century, as displayed in the scenario RCP3PD?		

4. How likely do you think it is that humankind will meet the two-degrees target? Discuss your opinion with your classmates.

Helpful articles to work on the exercises:

Artikel	Themen
<u>Causes for sea level rise</u>	Explanation of the causes for sea level rise
<u>Cenozoic</u>	Climate in the Cenozoic
<u>Ice age</u>	About the ice age and climate variability