

## The impact of climatic warming on the ecosystem carbon cycle of a high Arctic glacier foreland

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Current global model simulations suggest that climate warming will be more pronounced at high latitudes in the Northern Hemisphere. Carbon cycle in the Arctic terrestrial ecosystem is limited largely by temperature condition, and therefore, most likely to be sensitive to climatic warming. In order to investigate how carbon flows in the high Arctic terrestrial ecosystem will respond to projected climate change, we constructed a process-based model for simulating stand-level photosynthesis, root respiration and heterotrophic respiration on a glacier foreland in the high Arctic, Svalbard.

The model was calibrated to biomass and carbon flows determined in the field, and was shown to simulate effectively the net ecosystem production (NEP) in the summer season. Using this model, response patterns of NEP to temperature increases and to lengthening of growing season were examined. The results showed that the NEP is sensitive to temperature and can be negative under projected warming conditions. Lengthening of growing season is likely to compensate the negative effect of temperature increase, but the degree of compensation varies widely among plots.