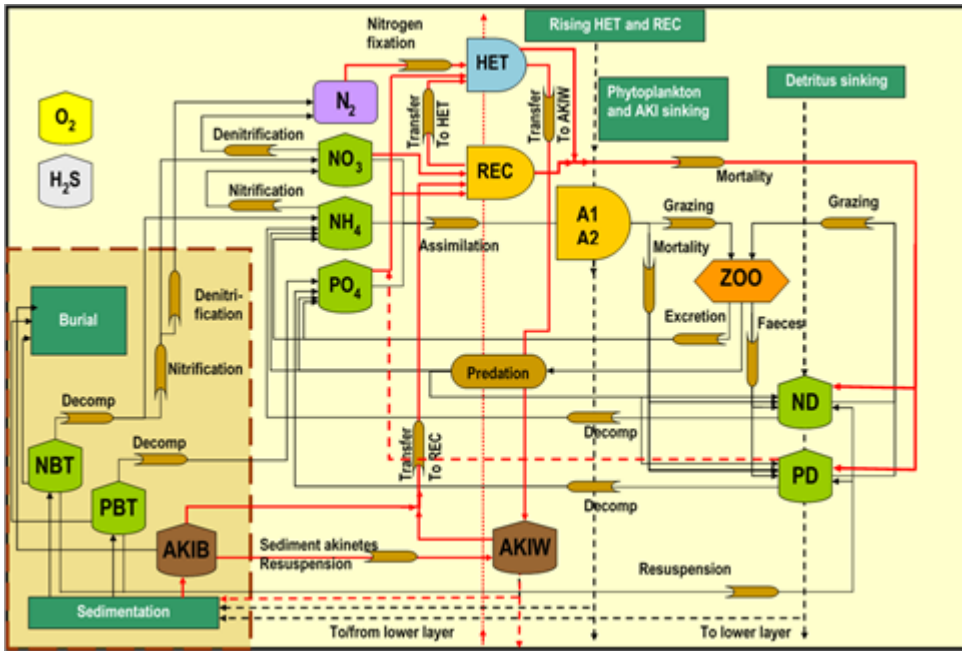


New Figure 2. The simplified cyanobacteria life cycle used in the present model (modified after Hense & Beckmann, 2006, 2010) representing N_2 fixing filamentous, akinetes producing cyanobacteria with stage-dependent upward and downward velocity. The model includes three compartments, the N_2 -fixing stage (HET), the resting stage of akinetes (AKI) and the recruiting stage (REC). Modified from Schneider et al. (2015) and Meier et al. (2019).



New Figure 3. The SCOBI model (modified from Eilola et al. 2009) including the cyanobacteria life cycle model components indicated by red lines, vegetative cells with heterocysts (HET), Akinetes in water (AKIW) and in sediment (AKIB), and Recruiting cells (REC). The inorganic nutrients nitrate, ammonia and phosphate are represented by NO_3 , NH_4 and PO_4 , respectively. The phytoplankton groups A1 and A2 represent characteristics of diatoms and the flagellates and others. The bulk zooplankton ZOO grazes on phytoplankton A1 and A2 while the parameterized predation closes the system of equations. Nitrogen and phosphorus detritus are described by ND and PD, respectively. Oxygen dynamics are included and hydrogen sulfide concentrations are represented by "negative oxygen equivalents ($1\text{ml } H_2S \text{ l}^{-1} = -2 \text{ ml } O_2 \text{ l}^{-1}$). The process descriptions of oxygen and hydrogen sulfide are simplified for clarity.

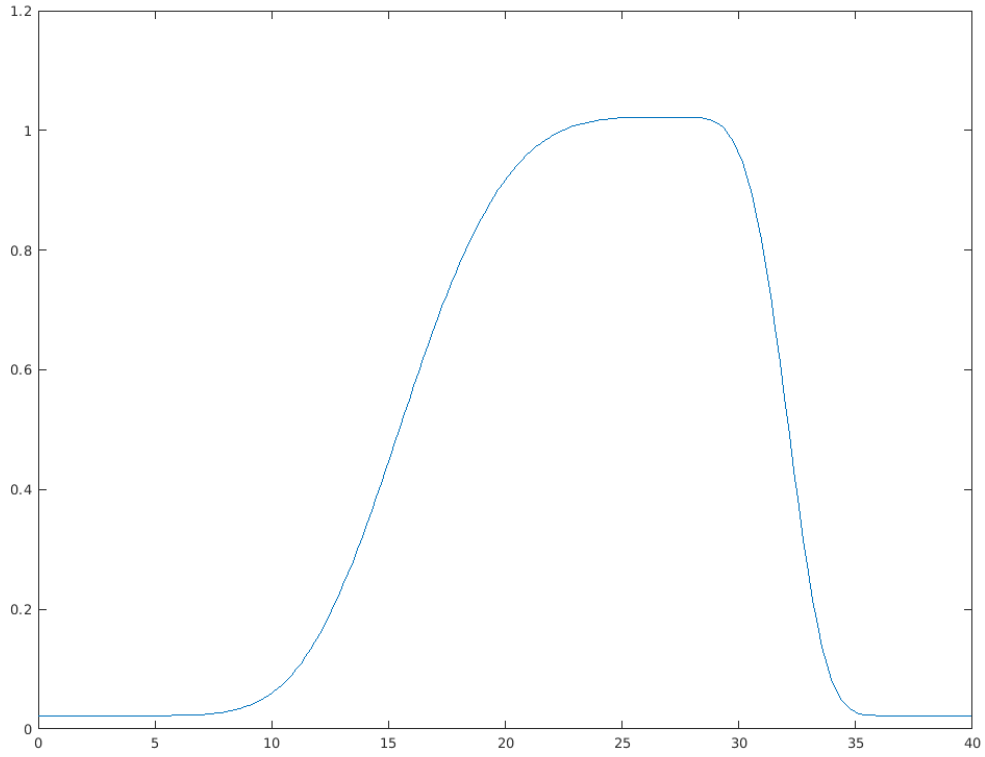


Figure R1. Temperature limitation curve according to Eq. (8) in Table S.3. Temperature on the x-axis and degree of limitation on the y-axis. The highest value indicates the least limitation.