Table S1. Stoichiometry for carbon oxidation, nitrification, and denitrification.

Component → | j		2	4	5	6	7	8	9	10	11	12	13	14	17
w	Process ↓	S_S	X_S	X_{BH}	X_{NS}	X_{NB}	X_P	S_O	S_{NO3}	S_{NH}	S_{ND}	X_{ND}	S_{Alk}	S_{NO2}
1	Aerobic growth of heterotrophs	$-\frac{1}{Y_H}$		$\left(1-\frac{X_{BH}}{X_{BH,max}}\right)$				$-\frac{1-Y_H}{Y_H}$		$-i_{XB}$			$-\frac{i_{XB}}{14}$	
2	Anoxic growth of heterotrophs on S_{NO3}	$-\frac{1}{Y_H}$		$\left(1-\frac{X_{BH}}{X_{BH,max}}\right)$					$-\frac{1-Y_H}{1.14Y_H}$	$-i_{XB}$			$\frac{1-Y_H}{14\cdot1.14Y_H}-\frac{i_{XB}}{14}$	$\frac{1}{1.14}\frac{1-Y_H}{Y_H}$
3	Anoxic growth of heterotrophs on S_{NO2}	$-\frac{1}{Y_H}$		$\left(1-\frac{X_{BH}}{X_{BH,max}}\right)$						$-i_{XB}$			$\frac{1-Y_H}{14\cdot1.72Y_H}-\frac{i_{XB}}{14}$	$-\frac{1}{1.72}\frac{1-Y_H}{Y_H}$
4	Aerobic growth of ammonia oxidizing bacteria				1			$-\frac{3.43-Y_{NS}}{Y_{NS}}$		$-i_{XB}-\frac{1}{Y_{NS}}$			$-\frac{i_{XB}}{14}-\frac{1}{7Y_{NS}}$	$\frac{1}{Y_{NS}}$
5	Aerobic growth of nitrite oxidizing bacteria					1		$-\frac{1.14-Y_{NB}}{Y_{NB}}$	$\frac{1}{Y_{NB}}$	$-i_{XB}$			$-\frac{i_{XB}}{14}$	$-\frac{1}{Y_{NB}}$
6	Decay of heterotrophs		$1-f_p$	-1			f_P					$i_{XB}-f_P i_{XP}$		
7	Decay of ammonia oxidizing bacteria		$1-f_p$		-1		f_P					$i_{XB}-f_P i_{XP}$		
8	Decay of nitrite oxidizing bacteria		$1-f_p$			-1	f_P					$i_{XB}-f_P i_{XP}$		
9	Ammonification of soluble organic nitrogen									1	-1		$\frac{1}{14}$	
10	'Hydrolysis' of entrapped organics	1	-1											
11	'Hydrolysis' of entrapped organic nitrogen										1	-1		