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| **Compartment(s)** | **Process** | **ID** | **Inequality constraint(s)** | **Reference(s)** |
| Dia + Phae,  Dia,  Phae | Gross primary production  (GPP)  \*except autumn 2009 | 1 | Between the min. and max. seasonal GPP to phytoplankton biomass-ratio, estimated from the planktonic primary productivity and respiration timeseries, as a function of biomass. | Asmus & Asmus (2016) |
| Respiration  \*only autumn 2009 | 2 | Between the min. and max. seasonal GPP minus NPP to phytoplankton biomass-ratio, estimated from the planktonic primary productivity and respiration timeseries, as a function of biomass. | Asmus & Asmus (2016) |
| Net particulate and dissolved primary production (NPP) | 3 | Between the min. and max. NPP to GPP-ratio, estimated from the planktonic primary productivity and respiration timeseries, as a function of GPP. | Asmus & Asmus (2016) |
| DOC exudation | 4 | Between the min. and max. exudation rate of Northfrisian Wadden Sea phytoplankton assemblages as a function of NPP. | Tillmann (2000) |
| Egestion | 5 | Between 0.05 and 0.5 of NPP. | Vézina & Platt (1998) |
| Dia | Production | 6 | Between the min. and max. in-situ specific growth rate of Southern North Sea diatom assemblages (0.9-1.5 per day at 7.1-8.9°C) as a function of mean seasonal temperature and biomass. | Stelfox-Widdicomb et al. (2004) |
| Phae | Production | 7 | Between the min. and max. in-situ growth rate of Northern Sea Phaeocystis cells (0.792-2.352 per day at 8-10°C) as a function of mean seasonal temperature and biomass. | Weisse & Scheffel-Möser (1990) |
| All living compartments | NPP /  Total respiration of compartments | 8 | Between the min. and max. seasonal Pelagic Production to Pelagic Respiration-ratio of the Sylt-Rømø Bight. | Loebl et al. (2007) |
| Bac | DOC uptake | 9 | Not more than the seasonal bacterial carbon demand of Dutch Wadden Sea bacterial communities, defined as fraction of exudated phytoplankton DOC. | Sintes et al. (2010) |
| Bacterial Growth Efficiency (BGE)  = Production /  DOC uptake | 10 | Between the min. and max. seasonal in-situ BGE of Dutch Wadden Sea free-living bacteria. | Sintes et al. (2010), appendix S2 |
| Egestion | 11 | Between 0.1 and 0.4 of bacterial production. | Fuhrmann (2000) |
| Respiration | 12 | At least 0.2 of DOC uptake. | Vézina & Savenkoff (1999) |
| Doc | Production  (imports + phytoplankton exudation) | 13 | Not more the seasonal carbon demand of Dutch Wadden Sea bacterial communities. | Sintes et al. (2010) |
| Export | 14 | At least 0.44 of DOC production, that is the annual average fraction of DOC used by particle-attached bacteria Dutch Wadden Sea bacterial communities. | Sintes et al. (2010) |
| Poc | Export | 15 | At least the amount of POC that is daily exported to the North Sea, calculated based on the estimated amount of 3.6\* tons of suspended particulate matter that are leaving the bight each year. | Fonova (2019), Postma (1990), Dellwig et al. (2006),  Rick et al. (2020) |
| Import | 16 | Not more than the North Sea export plus the sum of egestions by living compartments. |  |
| Cil, Nsci | Production Efficiency  = Production / Consumption | 17 | Between 0.1 and 0.6 of consumption. | Vézina & Platt (1998) |
| Tun, Clado, Cop, Biv, Gastr, Poly, Hydro, Ppil, Mlei, Bcu, Her | Assimilation efficiency  = Production / Consumption | 18 | At least 0.5 of consumption. | Vézina & Platt (1998) |
| Cil, Nsci, Tun, Biv, Gastr, Poly, Hydro, Ppil, Mlei, Bcu, Her  **Not**  **Clado, Cop due to incompatible constraints** | Production | 19 | The sum of carbon available to predators and exported carbon (i.e. predation by species not represented as compartments, outflush to North Sea) is not more than the maximum specific growth rate as a function of mean seasonal temperature and biomass. | Various references (see table X) |
| Cil, Nsci, Tun, Clado, Cop, Biv, Gastr, Poly, Her | Consumption | 20 | The sum of ingested prey and imported carbon (i.e. species feeding on prey items not represented as compartments) is not more than the maximum specific growth rate as a function of mean seasonal temperature and biomass. | Various references (see table X) |
| Hydro, Ppil, Mlei, Bcu | Consumption | 21 | The sum of ingested prey and imported carbon (i.e. species feeding on prey items not represented as compartments) is not more than the maximum specific clearance rate as a function of mean seasonal temperature and biomass times total prey concentration. | Various references (see table X) |
| Cil, Nsci, Tun, Clado, Cop, Biv, Gastr, Hydro, Ppil, Mlei, Bcu, Her | Respiration | 22 | Not more than the maximum specific respiration rate as a function of mean seasonal temperature and biomass. | Various references (see table X) |
| Cil | Respiration | 23 | At least the minimum specific respiration rate of microzooplankton as a function of mean seasonal temperature ()and biomass (): | Vézina & Platt (1988) |
| Nsci, Tun, Clado, Cop | Respiration | 24 | At least the minimum specific respiration rate of microzooplankton as a function of mean seasonal temperature ()and biomass (): | Vézina & Platt (1988) |
| Biv, Gastr, Poly, Hydro, Ppil, Mlei, Bcu | Respiration | 25 | At least 0.2 of consumption. | Vézina & Savenkoff (1999) |
| Her | Respiration | 26 | At least 0.0018 of biomass. | Hop & Graham (1995) |
| Tun, Clado, Cop, Biv, Gastr, Poly, Hydro, Ppil, Mlei, Bcu | Egestion | 27 | At least 0.1 of consumption. | Vézina & Platt (1998) |
| Her | Egestion | 28 | At least 0.066 of consumption. | Klumpp & von Westernhagen (1986) |
| Poly | Egestion | 29 | Not more than respiration. | Vézina & Platt (1998) |
| Cop | Specific ingestion of diatoms and microzooplankton | 30 | Between the min. and max. specific clearance rate as a function of biomass and prey concentration. | Gasparini (2000) |
| Biv, Mlei, Her | Diets | 31 | Between the min. and max. fractions of total ingestion. | Lindeque et al. (2015),  Kellnreitner et al. (2013) |