

**Table S1: Mean values of flows in mg C.m<sup>-2</sup>.month<sup>-1</sup>**

All flow names follow the same pattern : source\_compartment -> sink\_compartment.

Abbreviation for biological processes are: GPP=Gross Primary Production, EXP=Export, SED=Sedimentation, RAC = reserves accumulation by *Calanus*, RES=Respiration, RAC = reserves accumulation by *Calanus*, and for compartments: BAC = bacteria, BSL = Arctic cod larvae, Cal = *Calanus*, Car = carnivorous mesozooplankton, OMN = omnivorous mesozooplankton, MIC = microzooplankton, PHY = phytoplankton, DET = detrital particulate carbon, DOC = dissolved organic carbon and SIA = sea ice algae. EBB and WBB mean eastern and western Baffin Bay food web, respectively.

<b>Flows</b>	<b>EBB</b>	<b>WBB</b>
<b>GPP-&gt;PHY</b>	17.630	10.011
<b>PHY-&gt;MIC</b>	0.096	0.859
<b>PHY-&gt;CAL</b>	7.929	5.365
<b>PHY-&gt;OMN</b>	2.304	1.197
<b>PHY-&gt;POC</b>	3.763	0.923
<b>PHY-&gt;SED</b>	0.118	0.118
<b>PHY-&gt;RES</b>	3.420	1.549
<b>BAC-&gt;MIC</b>	0.066	0.029
<b>BAC-&gt;OMN</b>	0.087	0.029
<b>BAC-&gt;DOC</b>	0.028	0.337
<b>BAC-&gt;DET</b>	0.022	0.028
<b>BAC-&gt;RES</b>	7.584	3.608
<b>MIC-&gt;CAL</b>	0.034	0.177
<b>MIC-&gt;OMN</b>	0.035	0.164
<b>MIC-&gt;CAR</b>	0.013	0.161
<b>MIC-&gt;BSL</b>	0.002	0.007
<b>MIC-&gt;DOC</b>	0.045	0.241
<b>MIC-&gt;DET</b>	0.056	0.517
<b>MIC-&gt;RES</b>	0.062	0.442
<b>MIC-&gt;EXP</b>	0.007	0.068
<b>CAL-&gt;CAR</b>	2.445	1.387
<b>CAL-&gt;BSL</b>	0.003	0.007
<b>CAL-&gt;DOC</b>	1.779	0.884
<b>CAL-&gt;DET</b>	1.773	3.292
<b>CAL-&gt;RES</b>	1.804	2.192
<b>CAL-&gt;EXP</b>	0.014	0.109
<b>CAL-&gt;RAC</b>	1.095	2.569
<b>OMN-&gt;CAR</b>	0.055	0.656
<b>OMN-&gt;BSL</b>	0.003	0.007

<b>OMN-&gt;DOC</b>	0.747	1.100
<b>OMN-&gt;DET</b>	1.280	1.379
<b>OMN-&gt;RES</b>	0.772	2.945
<b>OMN-&gt;EXP</b>	0.518	1.790
<b>CAR-&gt;BSL</b>	0.004	0.007
<b>CAR-&gt;DOC</b>	0.511	0.342
<b>CAR-&gt;DET</b>	1.209	0.892
<b>CAR-&gt;RES</b>	0.528	0.585
<b>CAR-&gt;EXP</b>	0.260	0.378
<b>BSL-&gt;DET</b>	0.004	0.010
<b>BSL-&gt;RES</b>	0.001	0.002
<b>BSL-&gt;EXP</b>	0.007	0.016
<b>DET-&gt;MIC</b>	0.092	0.887
<b>DET -&gt;CAL</b>	0.949	2.387
<b>DET -&gt;OMN</b>	0.948	1.289
<b>DET -&gt;PDC</b>	0.950	0.122
<b>DET -&gt;SED</b>	1.398	1.328
<b>DET -&gt;EXP</b>	0.008	0.105
<b>DOC-&gt;BAC</b>	7.787	4.031
<b>DOC -&gt;EXP</b>	0.036	0.877
<b>GPP-&gt;SIA</b>		10.382
<b>SIA-&gt;CAL</b>		2.511
<b>SIA-&gt;OMN</b>		5.198
<b>SIA-&gt;PDC</b>		0.958
<b>SIA-&gt;SED</b>		0.110
<b>SIA-&gt;RES</b>		1.604

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