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Concentration, sources and light absorption characteristics of dissolved organic carbon on a medium-sized valley glacier, northern Tibetan Plateau

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1 Methodology

Discharge data collection and analysis

The hydrological gauging site was installed approximately 0.8 km downstream of the glacier terminus and met the requirements for a hydrological gauging site. Horizontal walls were built on the both sides of the river, and an automatic barometric sensor (HOBO Water Level Logger, Onset, America) was installed in the wall to record water pressure every 10 minutes. This was then used to calculate water level. A bridge across the river facilitated the flow velocity measurement using a propeller blade current meter (Model LS25-1, Huazheng Hydrometric Instrument Ltd). The river channel was divided into nine segments in which flow velocity and water depth were measured. The mean flow velocity, segment width and water depth of each segment enabled calculation of discharge for a given water level. By including a maximum and minimum annual water level, a relationship with water level and discharge was established. Therefore, the HOBO water lever was converted to a discharge time series covering all seasons.

2. Supporting Tables

Table S1. DOC concentrations of blank samples for the entire field work and analysis processes.

Date	Concentration (μg L^{-1})	Date	Concentration (μg L^{-1})
20 May, 2015	28	30 May, 2015	49
2 June, 2015	31	15 June, 2015	28
25 June, 2015	27	5 July, 2015	26
16 July, 2015	30	25 July, 2015	25
15 August, 2015	37	25 August, 2015	29
15 August, 2015	38	19 August, 2015	30
5 September, 2015	23	12 September, 2015	51
19 September, 2015	30	27 September, 2015	33
5 October 2015	23	30, July, 2014	31
4 August, 2014	33	6 August, 2014	36
Mean	32 ± 7		

Table S2. Information of the studied glaciers and DOC concentrations (μg L^{-1}) of proglacial streamwater samples across the TP.

Glacier ID	Glacier name	Mountain range	DOC (monsoon)	DOC (non-monsoon)
LHG	Laohugou Glacier No. 12	Qilian	325	394
TGL	Xiaodongkemadi Glacier	Tanggula	150	212
EV	East Rongbu Glacier	Middle Himalaya	139	171
ZD	Zhadang Glacier	Nyainqêntanglha	169	222
DML	Demula Glacier	Eastern Himalaya	103	134
QY	Qiangyong Glacier	Central Himalaya	124	167

3. Supporting figures

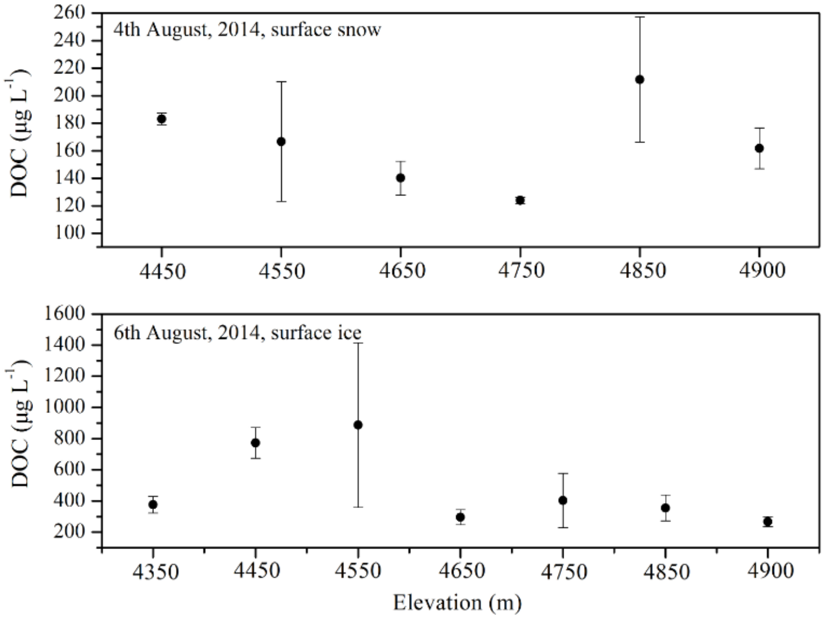

Figure S1. Spatial variations in DOC concentrations for surface snow and ice at LHG Glacier.

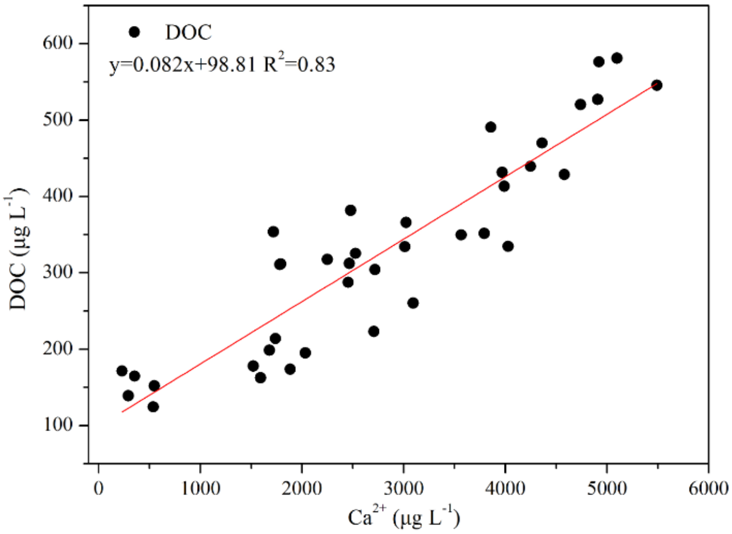

Figure S2. Relationship between concentrations of Ca^{2+} and DOC in snowpit samples.

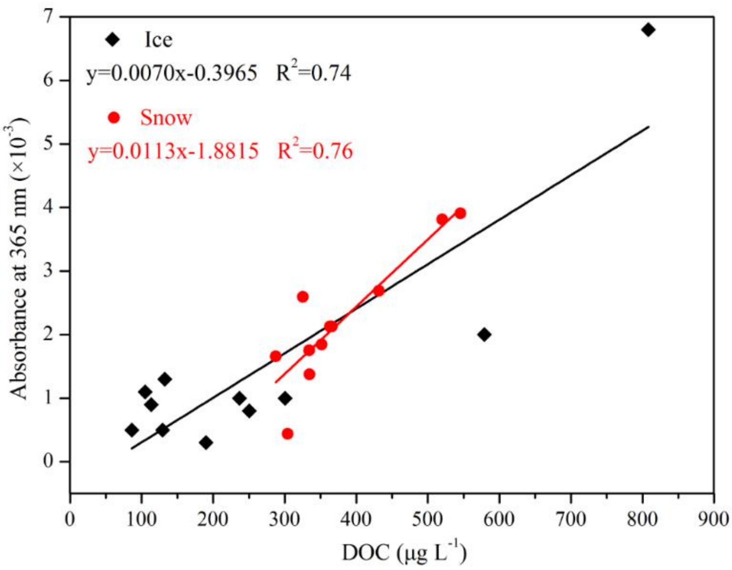

Figure S3. Relationship between light absorbance at 365 nm and DOC concentrations in snow and ice samples.

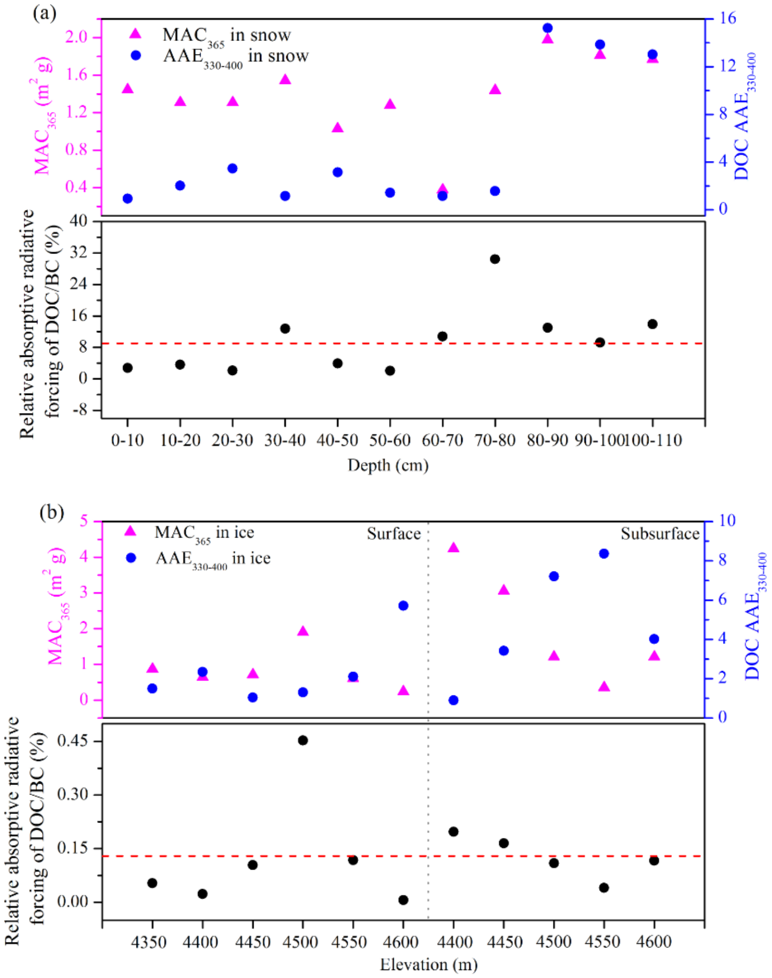

Figure S4. Light absorption characteristics and relative contribution to radiative forcing of DOC versus BC in snow (a) and ice (b) samples.

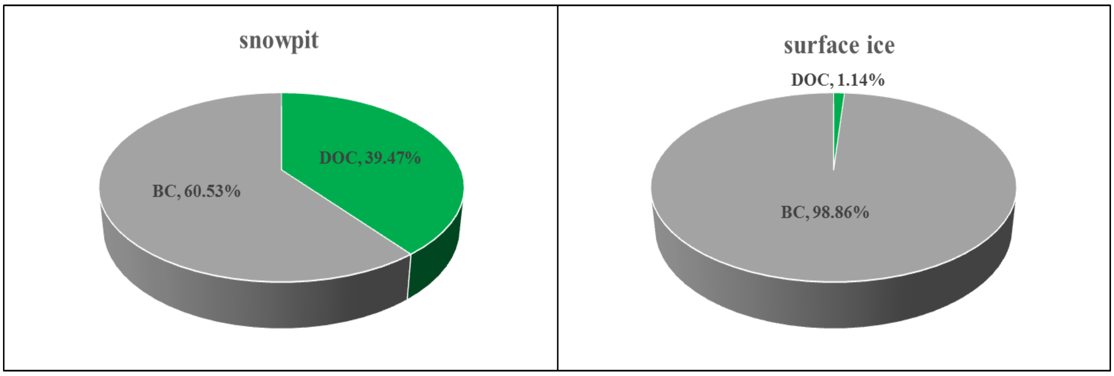

Figure S5. The DOC/BC ratios of snow and ice in LHG Glacier.

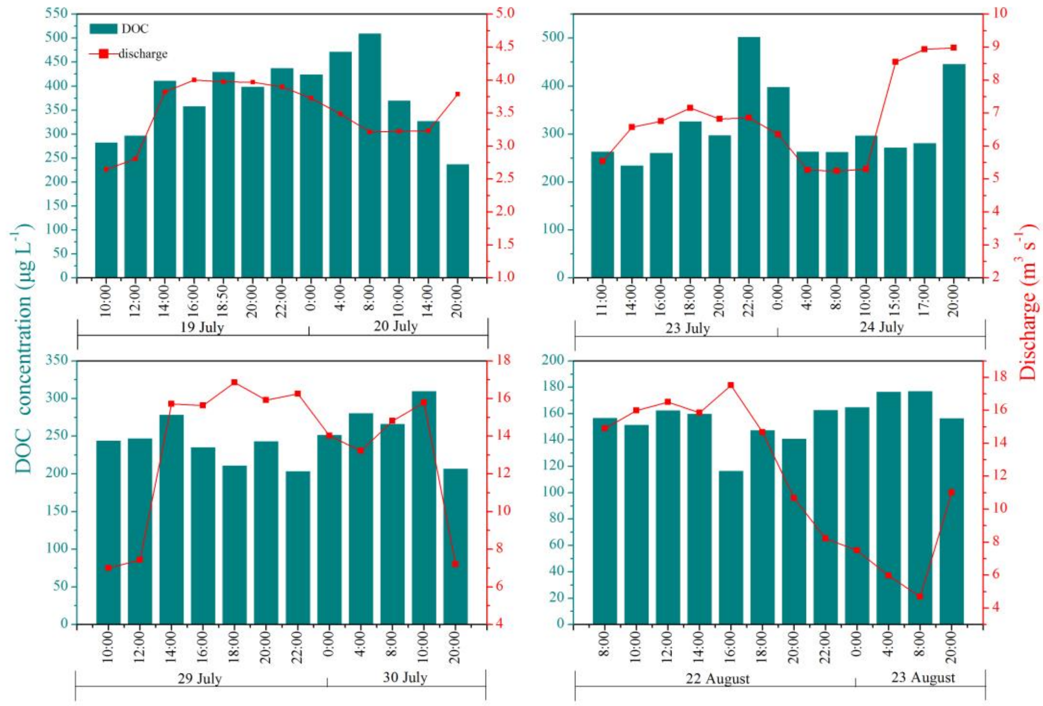

Figure S6. Diurnal variations in the DOC concentration and discharge at the gauge station in 2015 (local time, hh:mm).