Climate change threat package Hydrology

Site description: Mainsteam Mekong hydrological stations at Chiang sen (CS), Luang Prabang (LB), Vientane (VN), Nakhom Phanom (NP), Mukdahan (MK), Pakse (PK) and Kratie (KR)

Project: Mekong ARCC

Hydrological analysis of the impacts of climate change has been undertaken for the following mainstream Mekong stations: Chiang sen (CS), Luang Prabang (LB), Vientane (VN), Nakhom Phanom (NP), Mukdahan (MK), Pakse (PK) and Kratie (KR) (Figure 1).

The memo presents the results of the analysis of climate change impacts on:

- Onset of hydro-biological seasons at each mainstream station
- Duration of hydro-biological seasons at each mainstream station
- Hydrograph of each mainstream station
- Daily average water level at each mainstream station.

Definitions

Typical year: The daily values (temp, rainfall etc) for a typical year is calculated as an average of that day over the 25 years of modelled data.

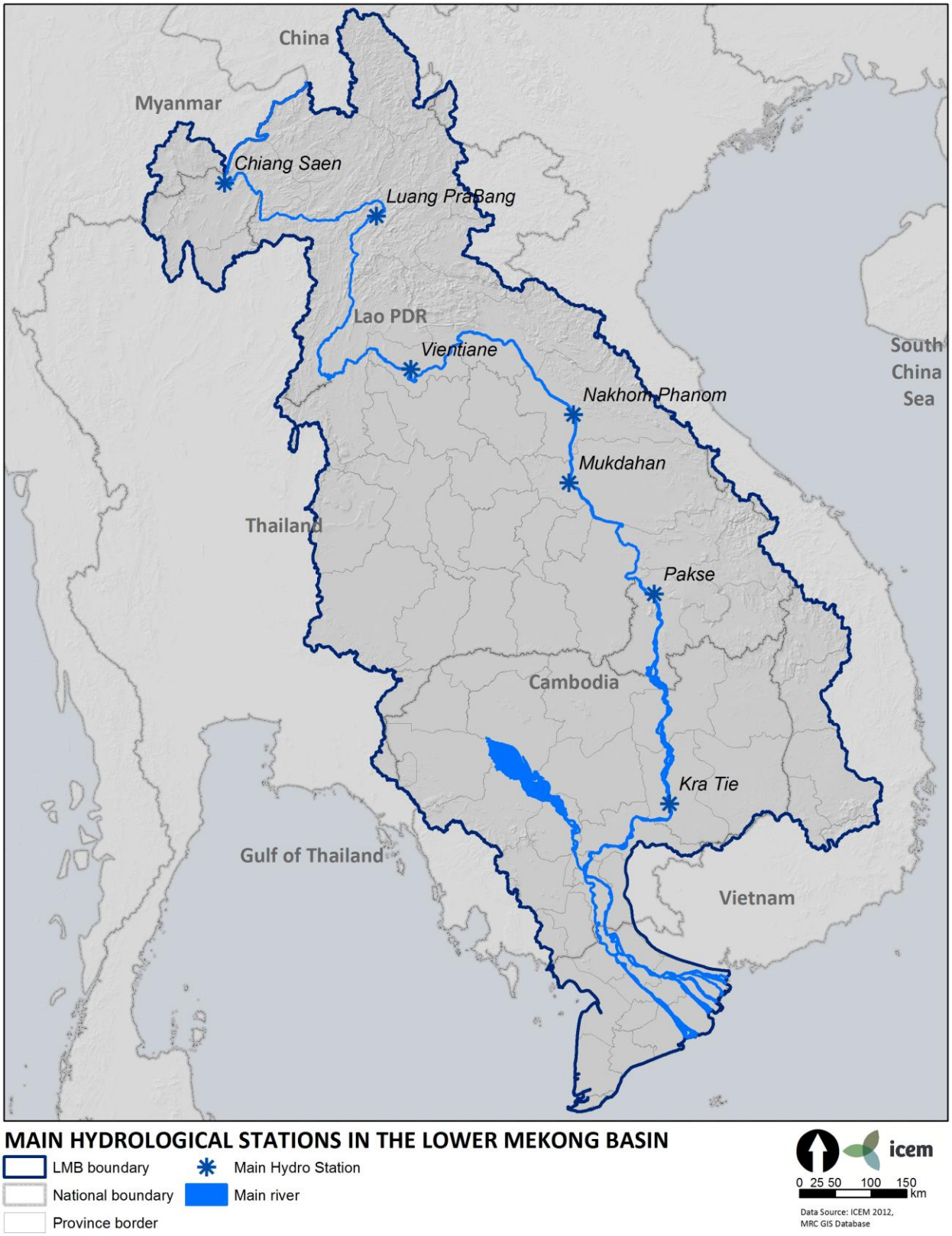
Hydrobiological seasons: Hydro-biological seasons take into account both the flow of the river, and the biological communities that depend on the flow. The start and end of each season is defined by specific flow thresholds rather than by particular calendar days and the date of the onset of seasons may vary from year to year[1]. The MRC has defined the following hydro-biological seasons for the Mekong, note that for the purposes of this project the Dry season and Transition season B have been joined:

- Transition season B and Dry season -From the end of the flood season to the first time in the year that flows exceed twice the minimum dry season discharge of that year.
- Transition season A – From the end of the Dry season to the firs upcrossing of the long term mean annual discharge
- Flood season: From the end of Transition season A to the last downcrossing of the long term mean annual discharrge

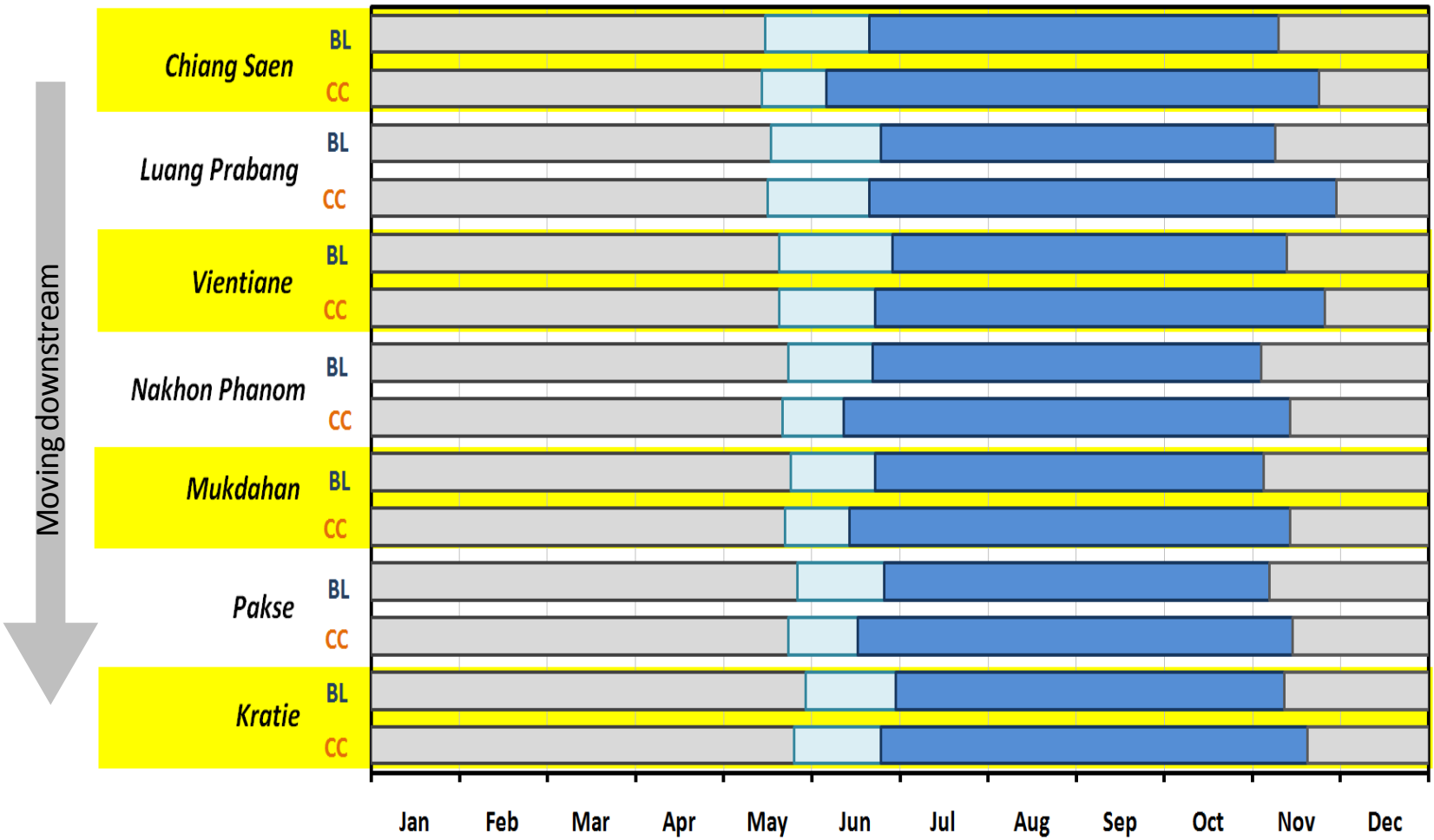
[1] Burnhill, T. *(ed)* (2009) MRC Management Information Booklet Series No. 2, The Flow of the Mekong. Mekong River Commission

Hydrology threat package

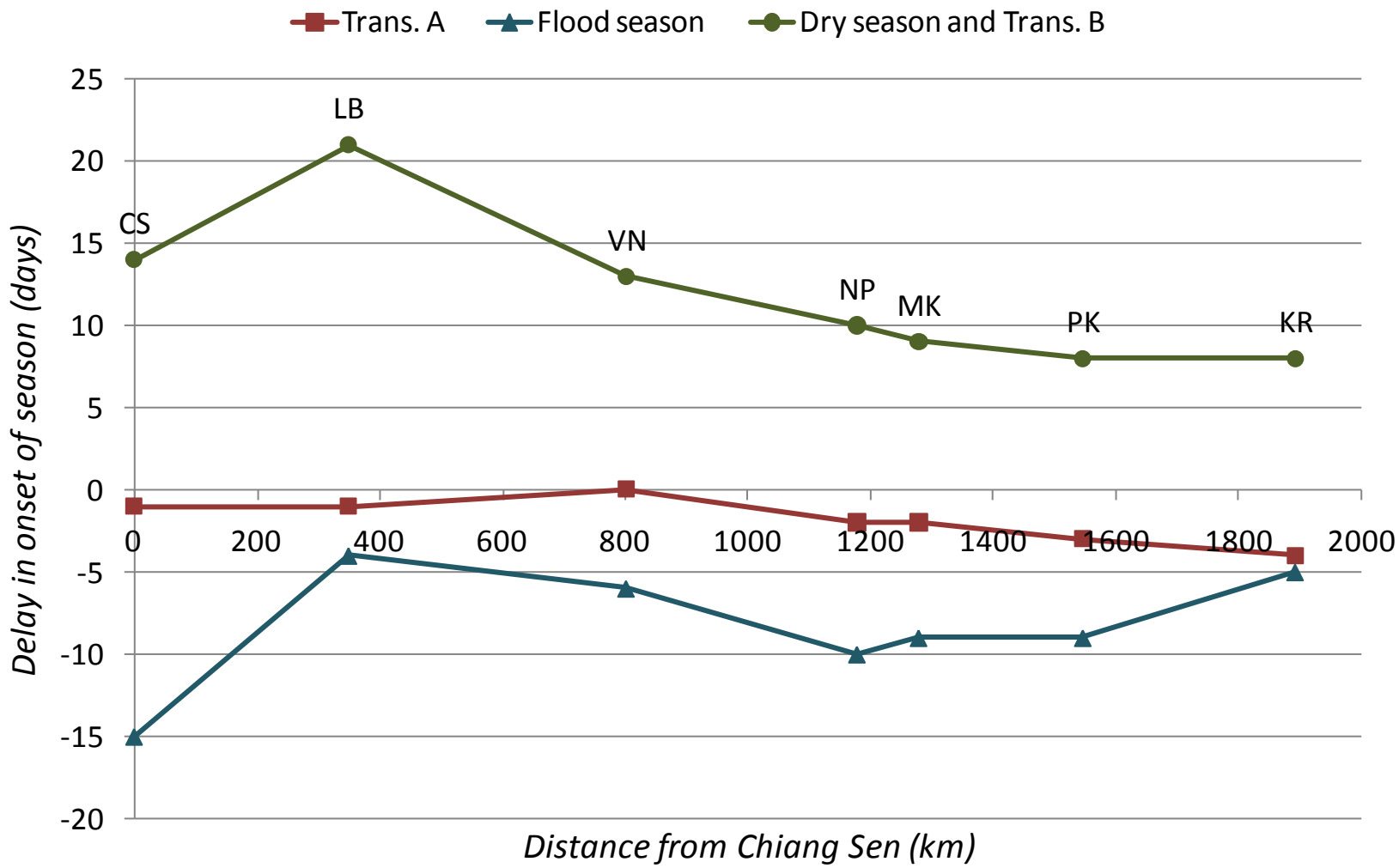
Figure 1. Location of mainstream Mekong stations



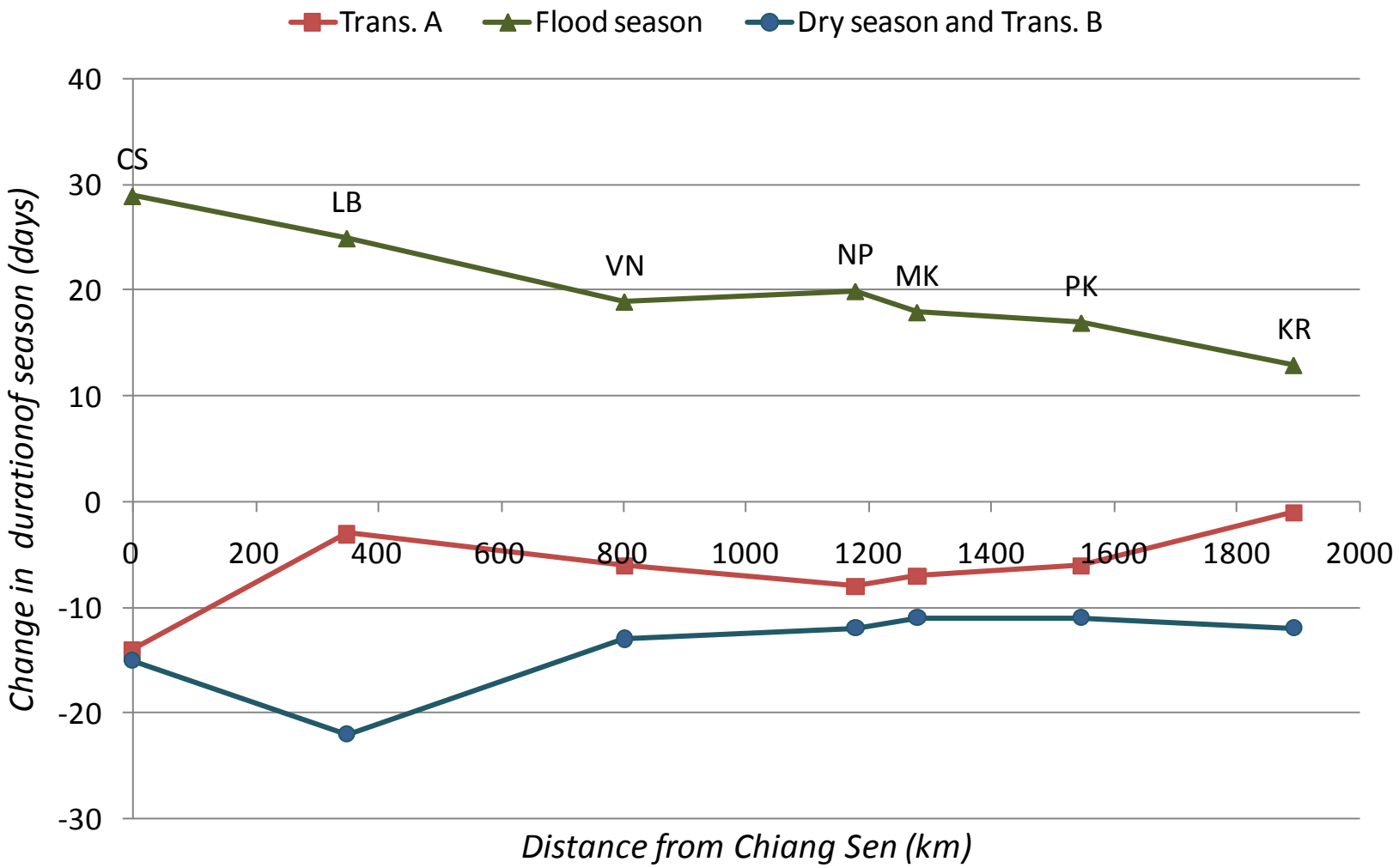
All stations – Hydro-biological seasons



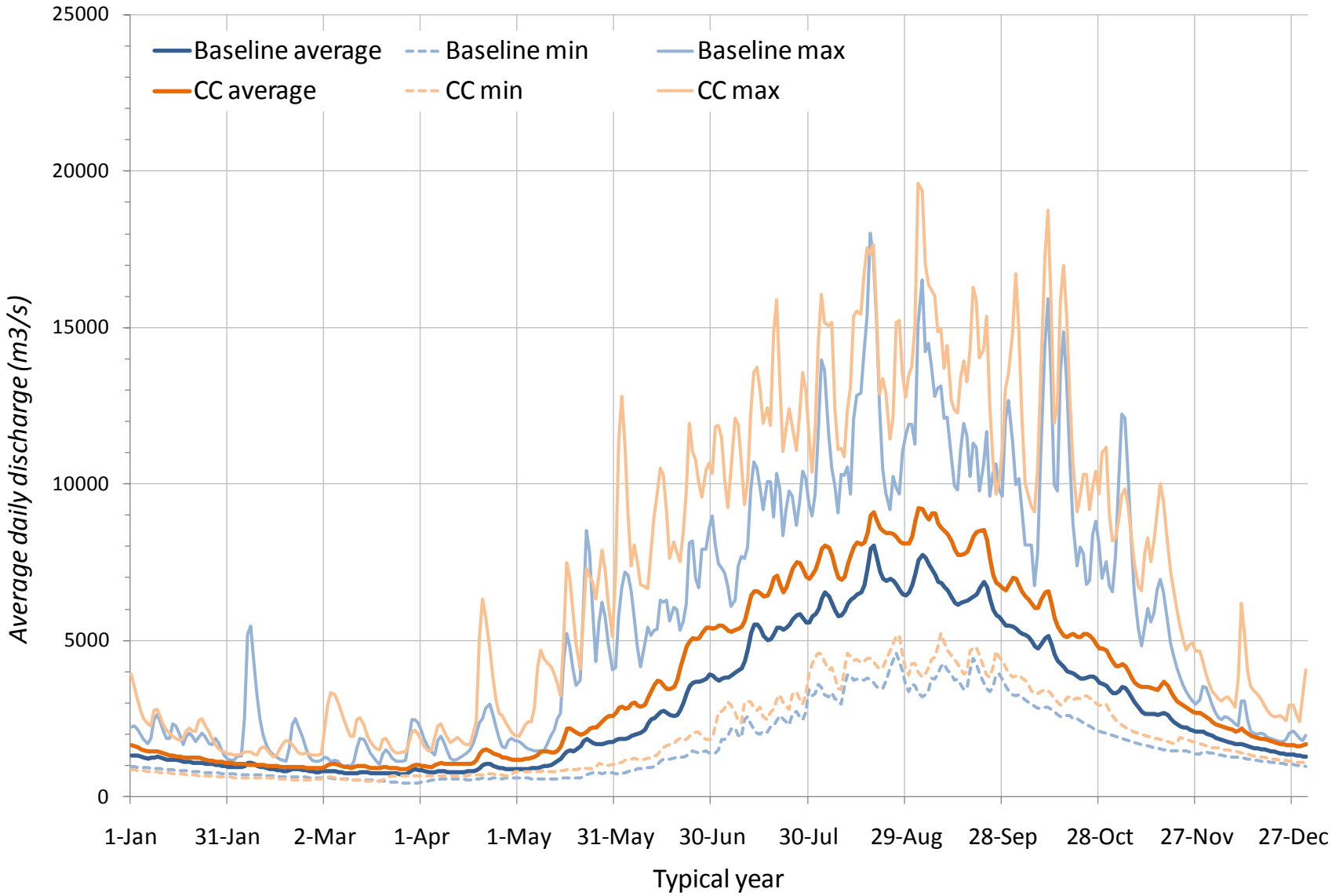
All stations – Hydro-biological seasons



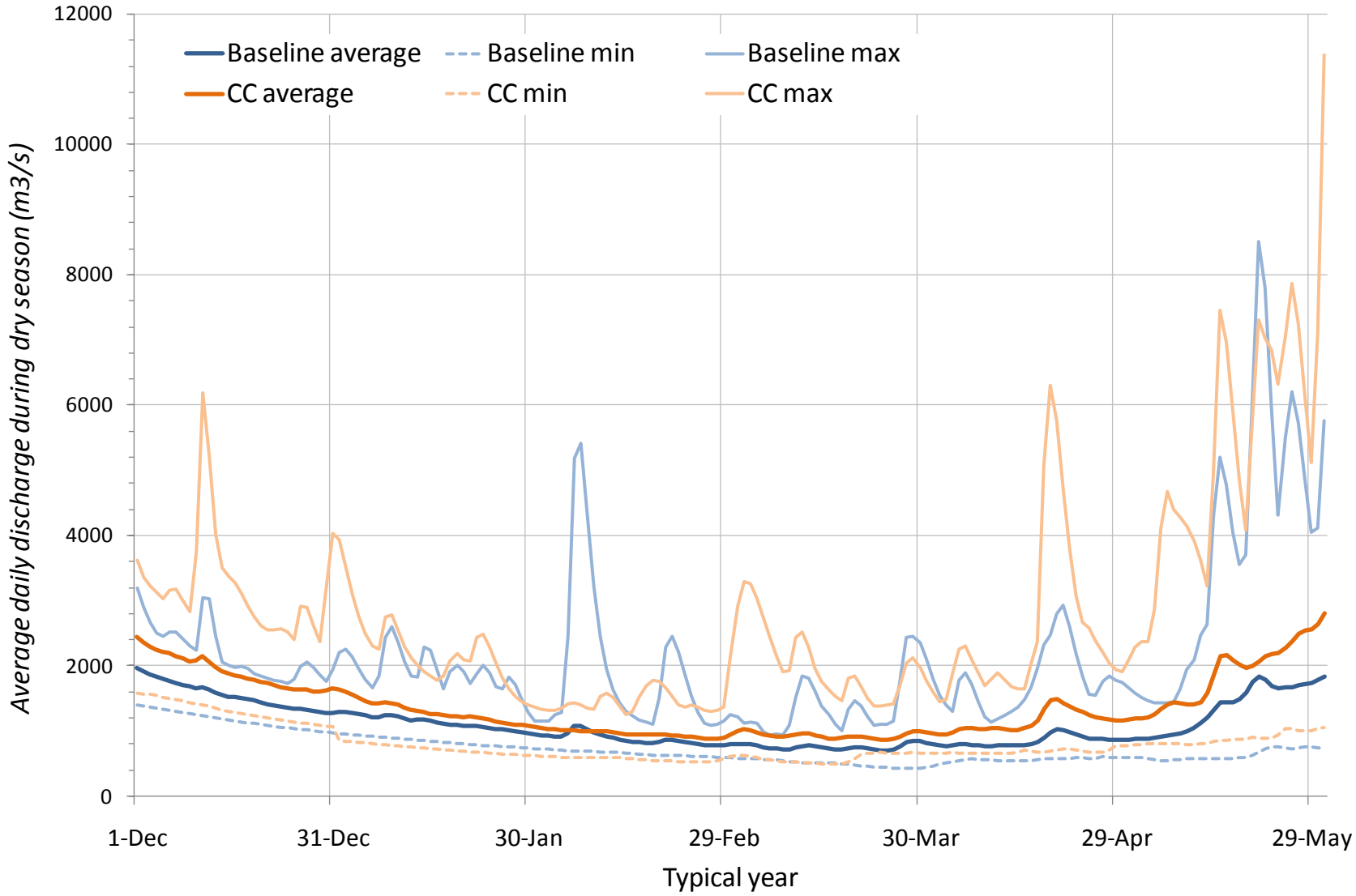
All stations – Hydro-biological seasons



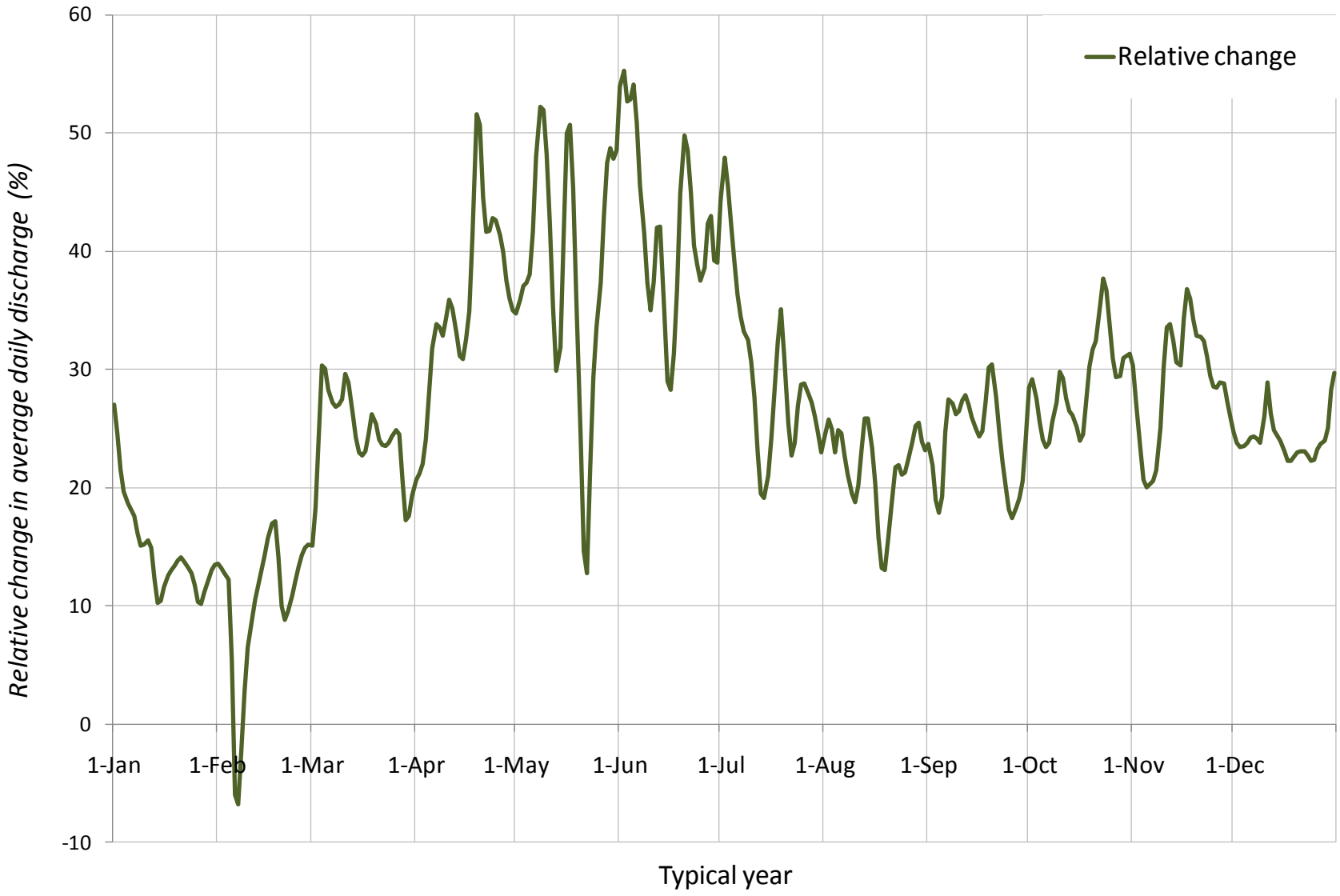
Chiang Sen – Flow



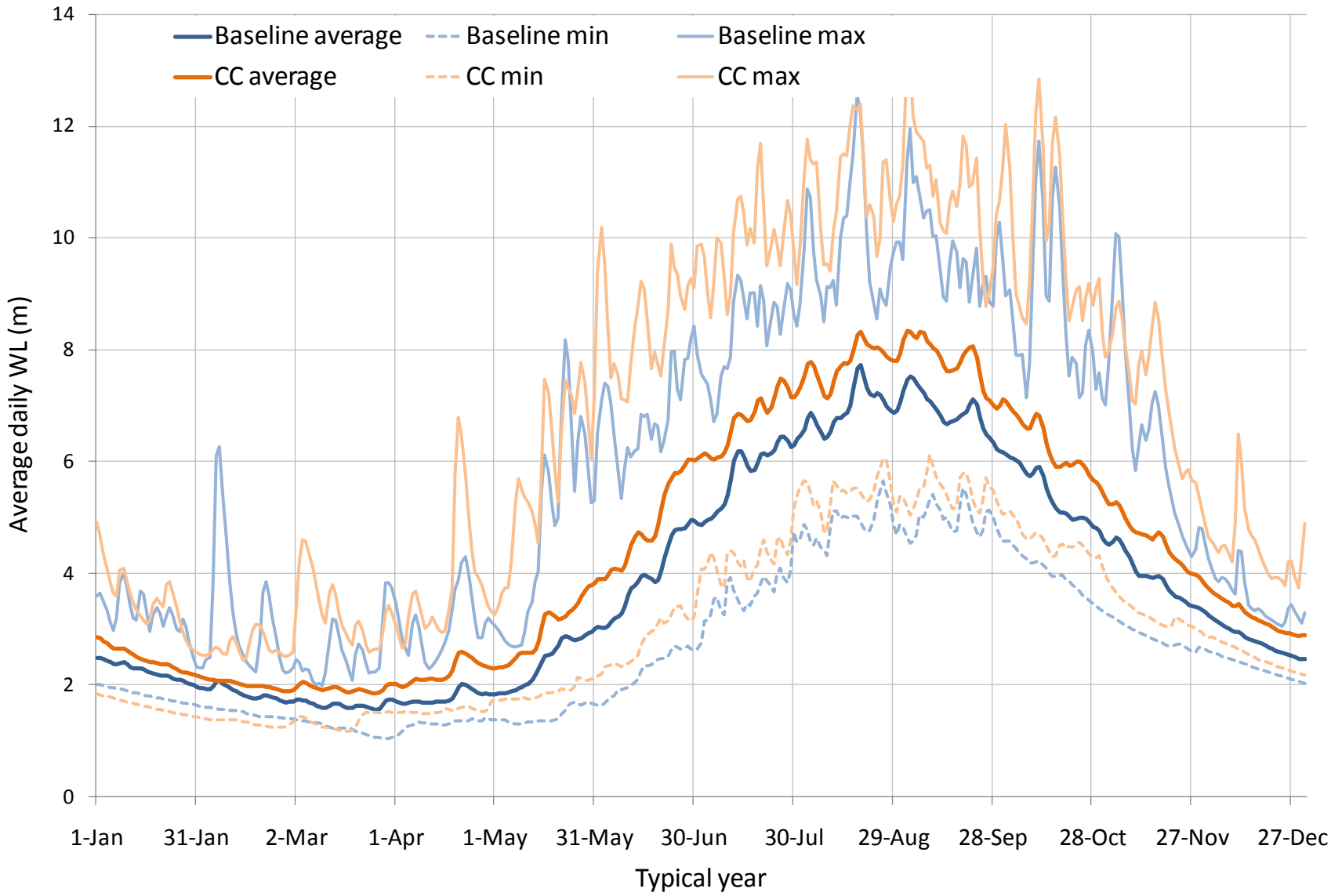
Chiang Sen – Flow



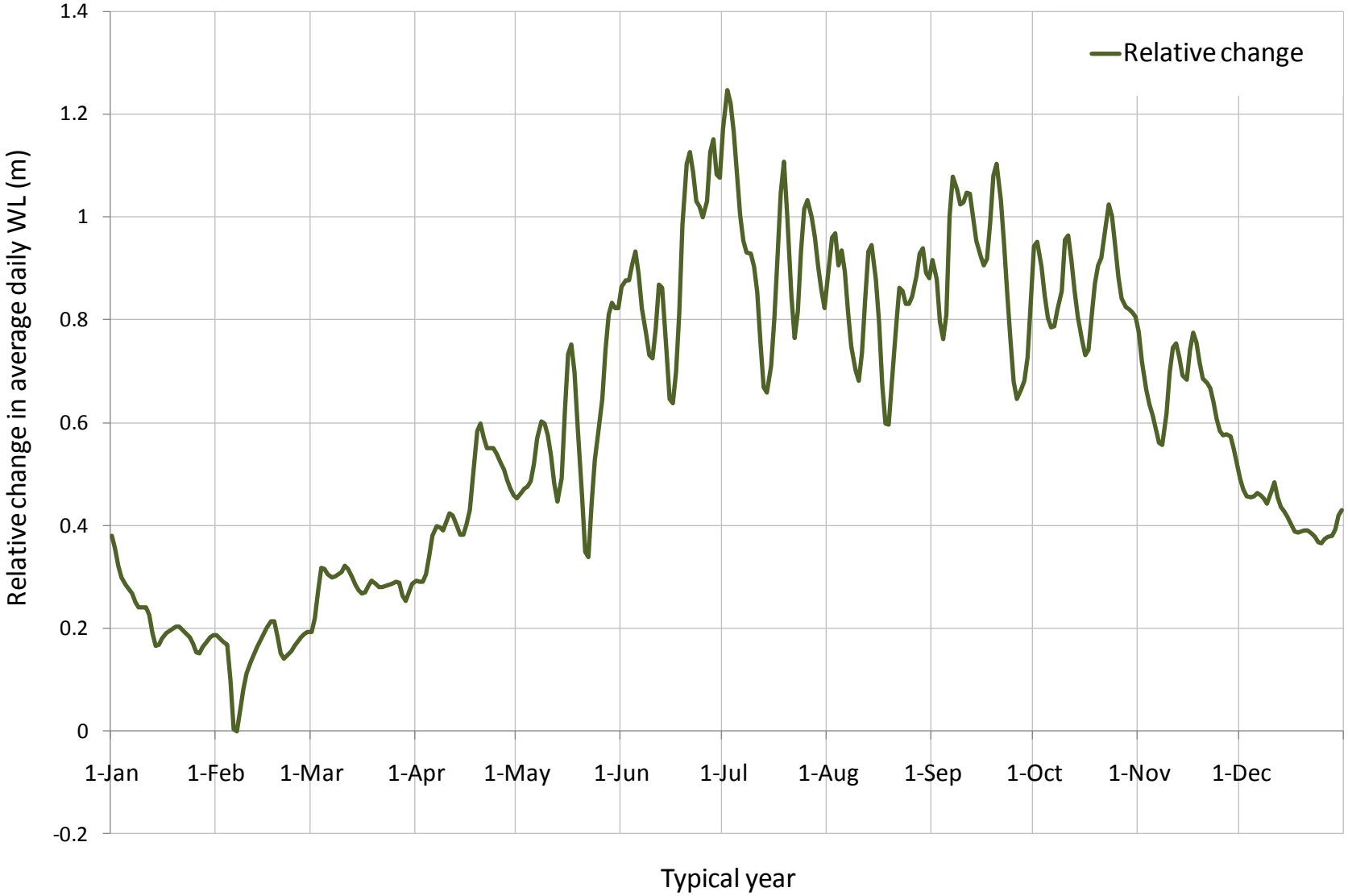
Chiang Sen – Flow



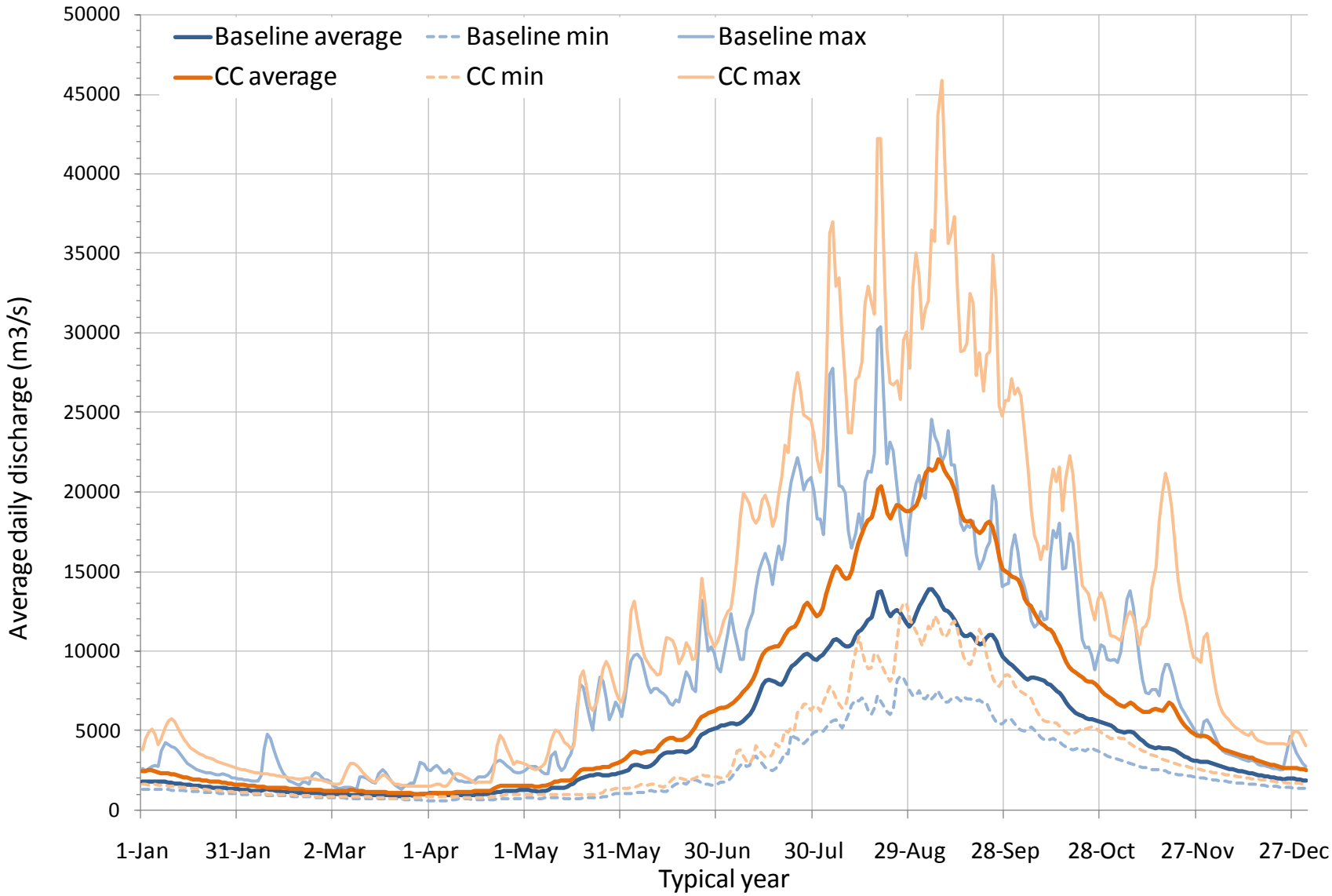
Chiang Sen – Water level



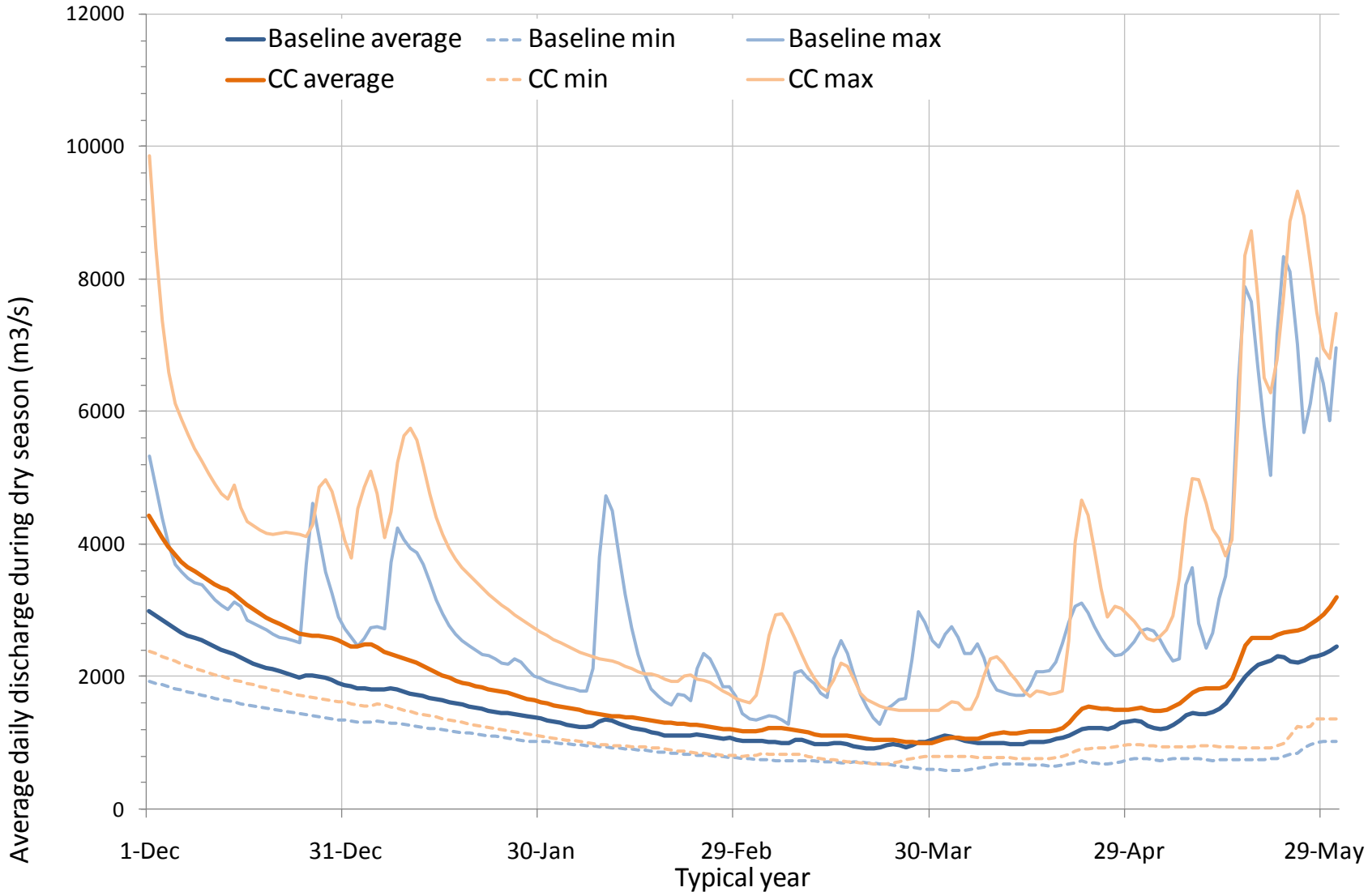
Chiang Sen – Water level



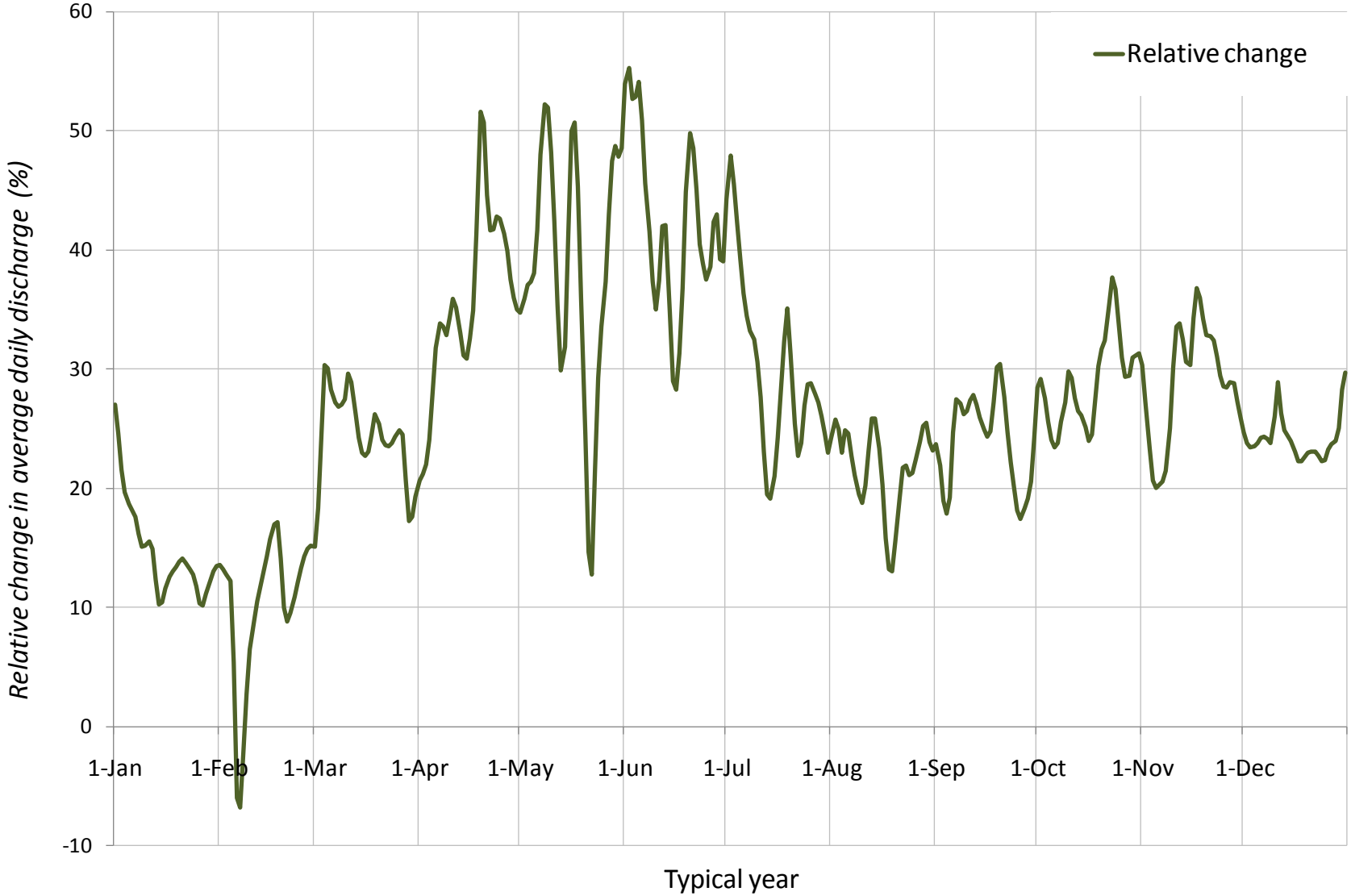
Luang Prabang – Flow



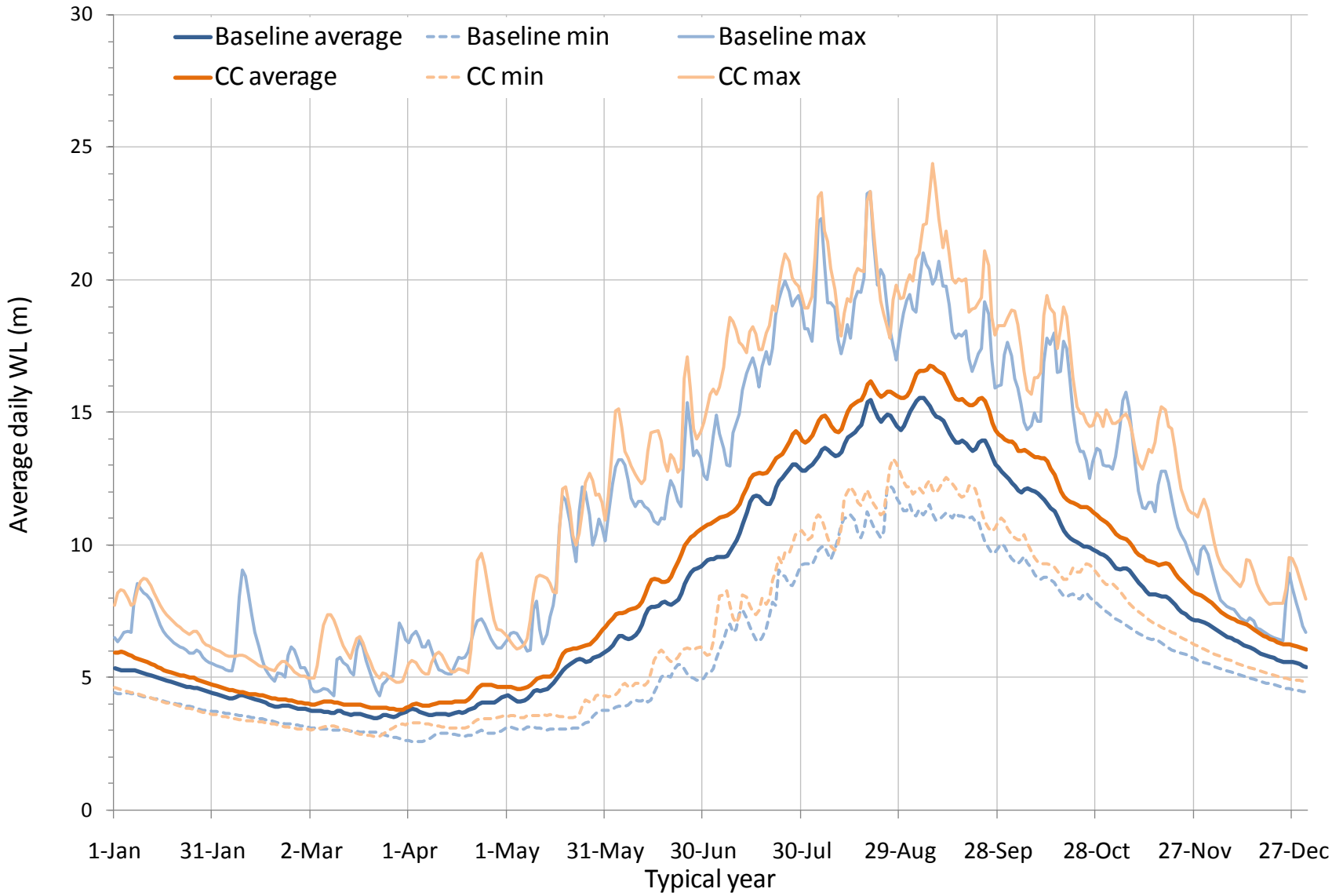
Luang Prabang – Flow



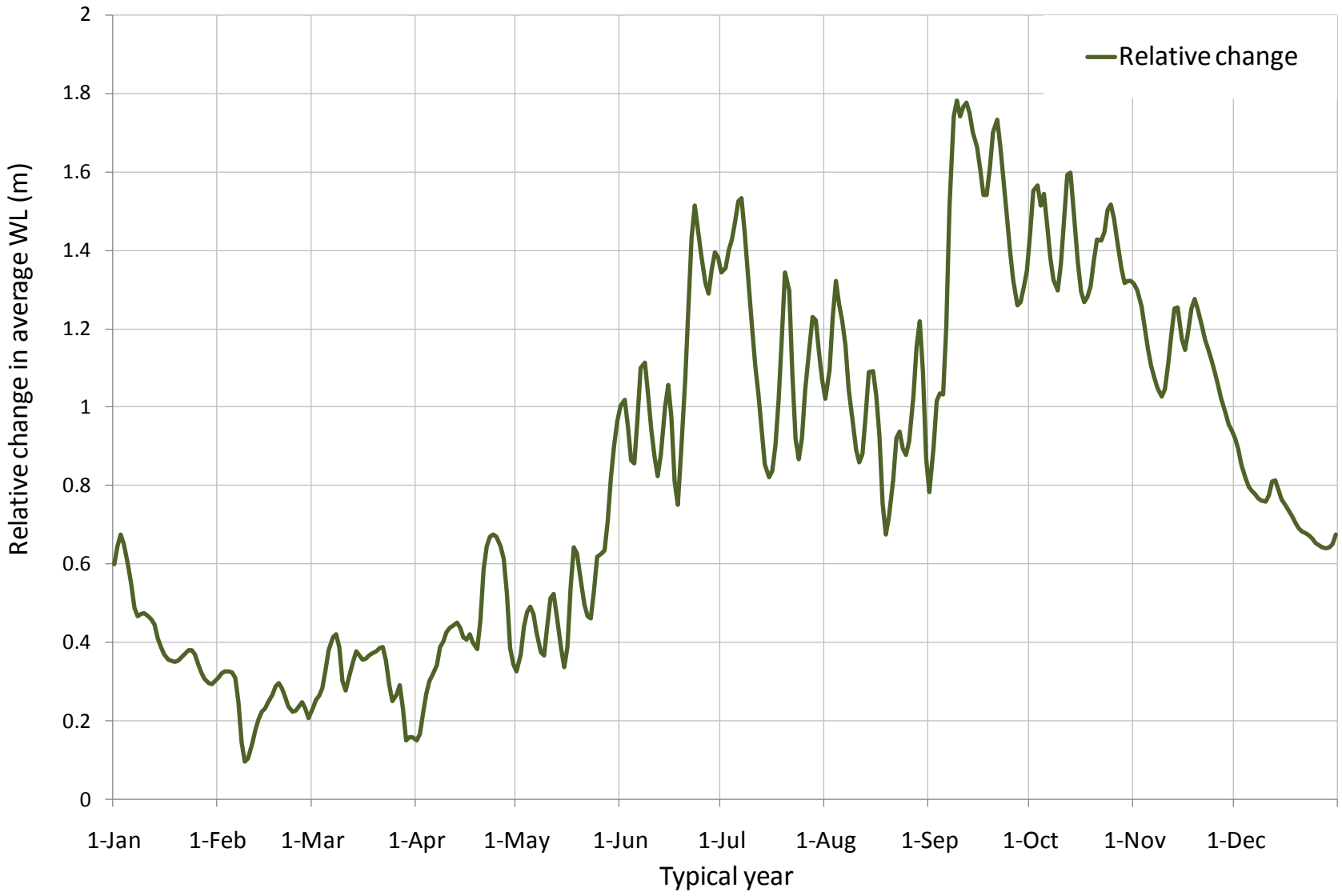
Luang Prabang – Flow



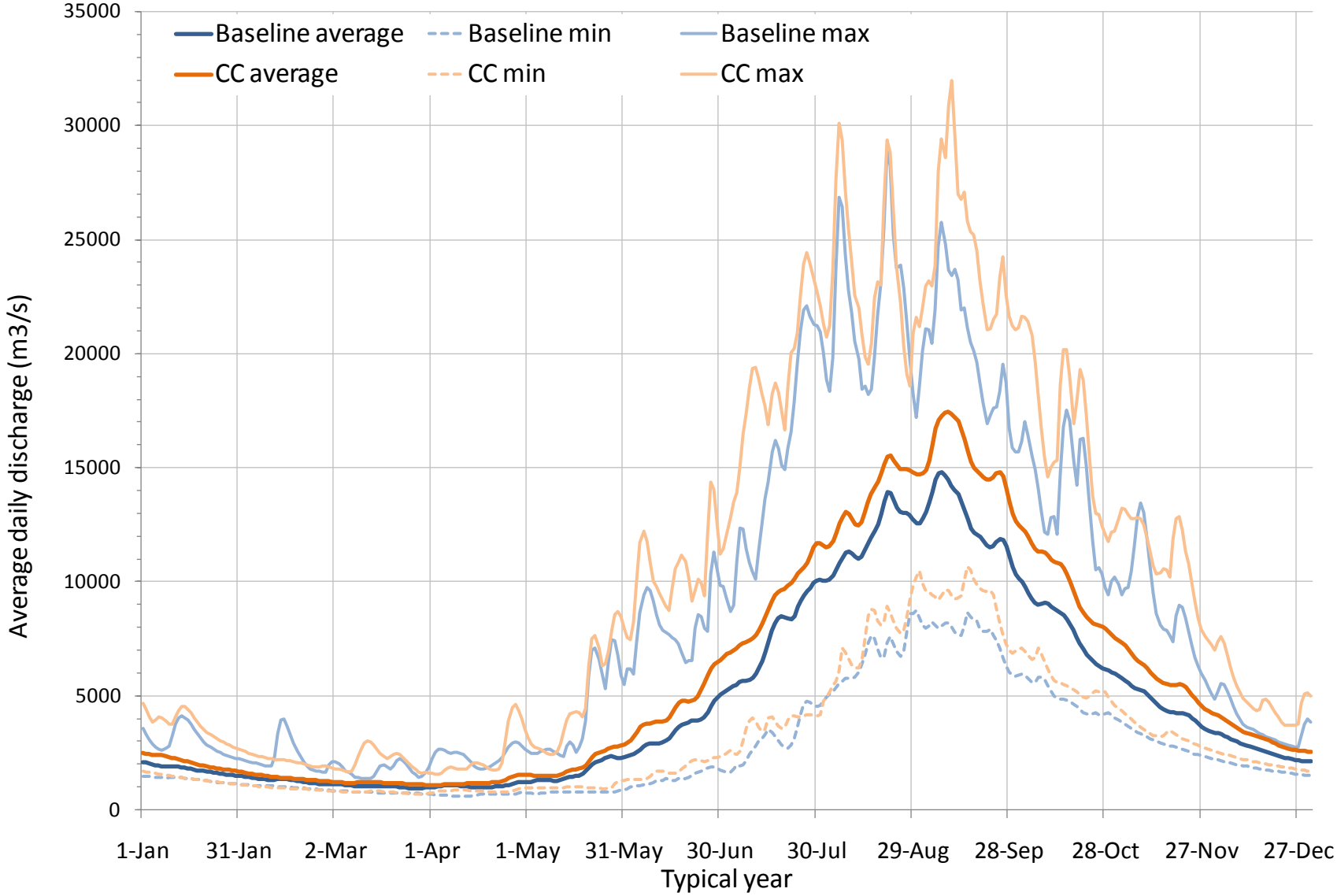
Luang Prabang – Water level



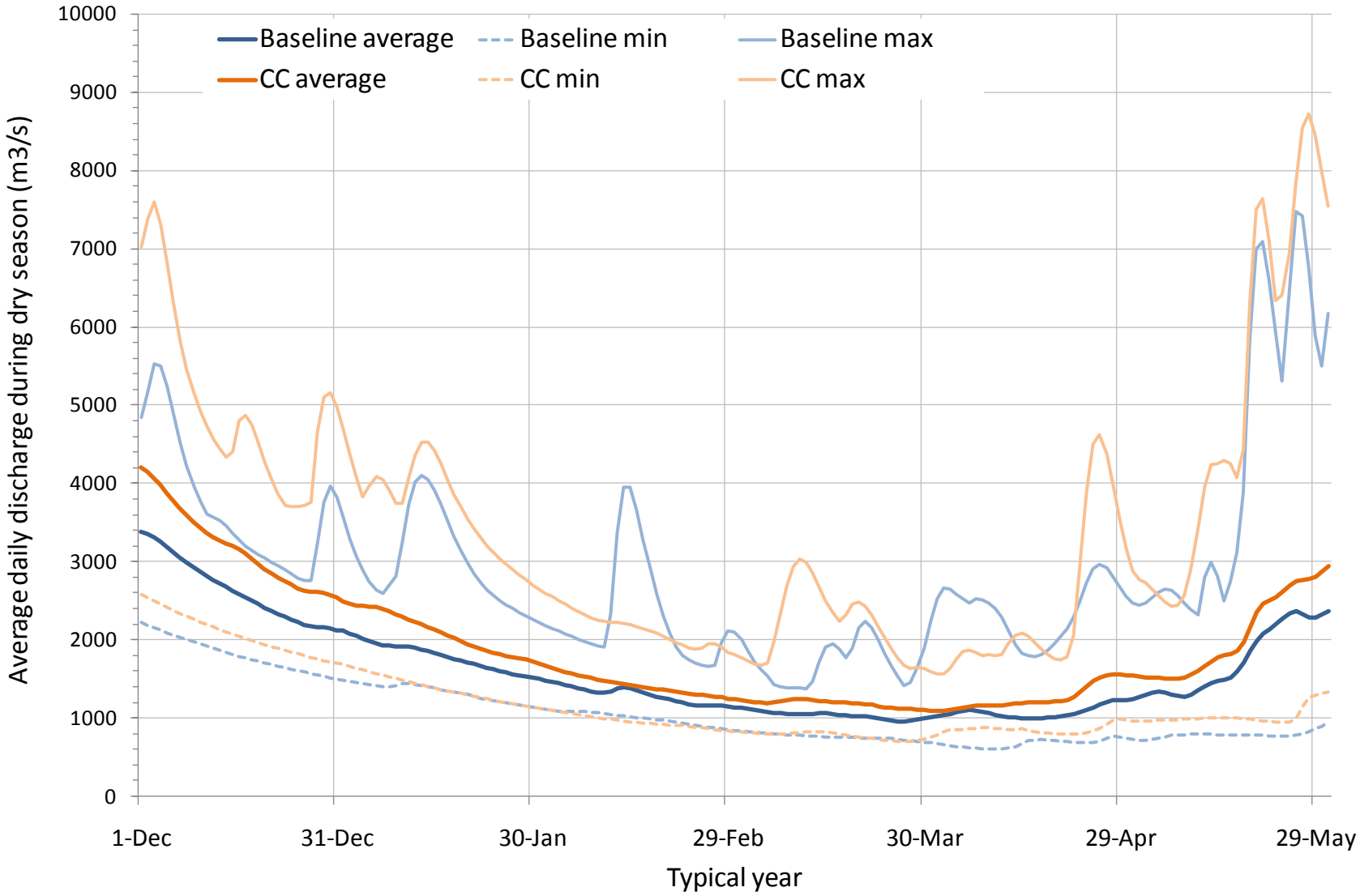
Luang Prabang – Water level



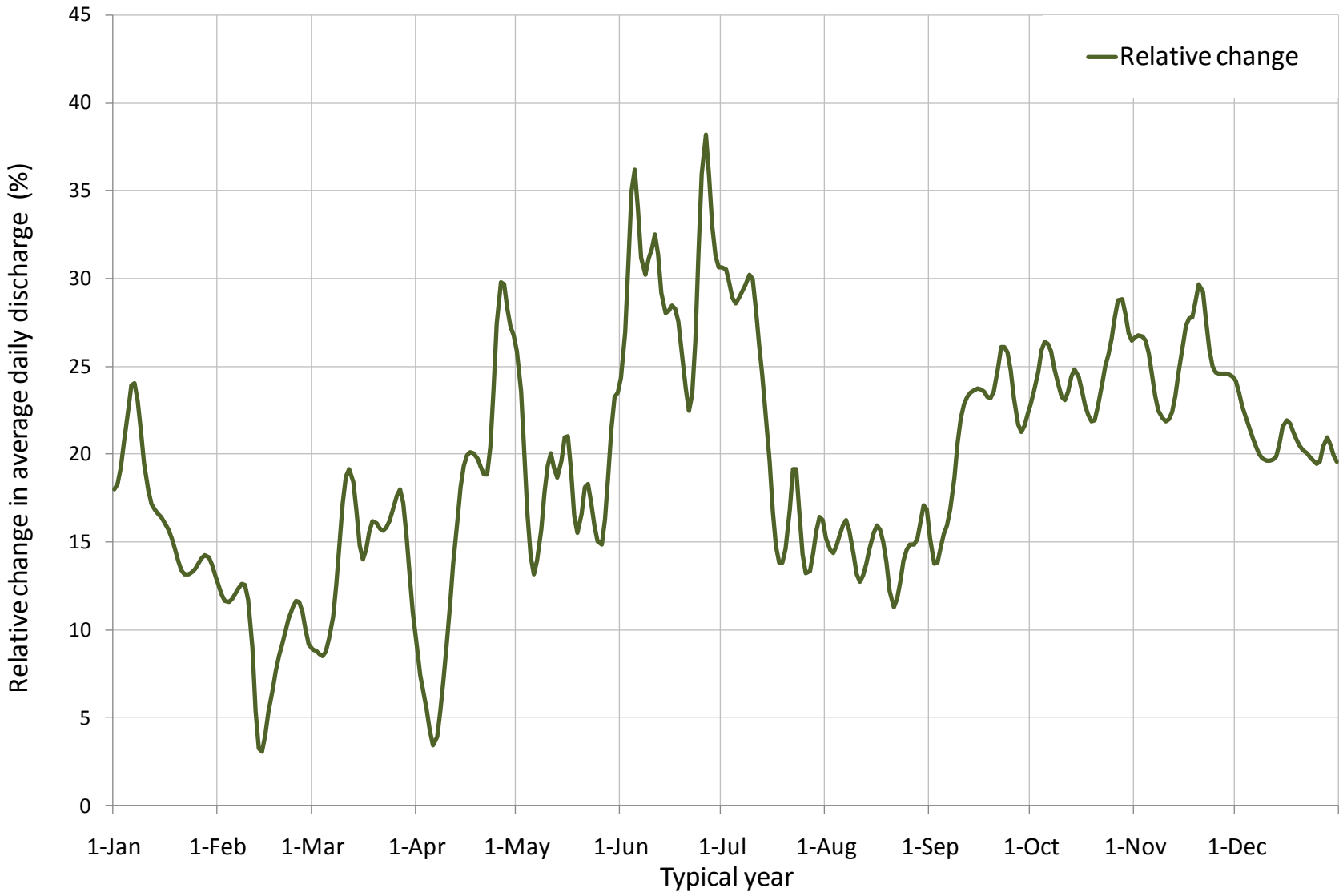
Vientiane – Flow



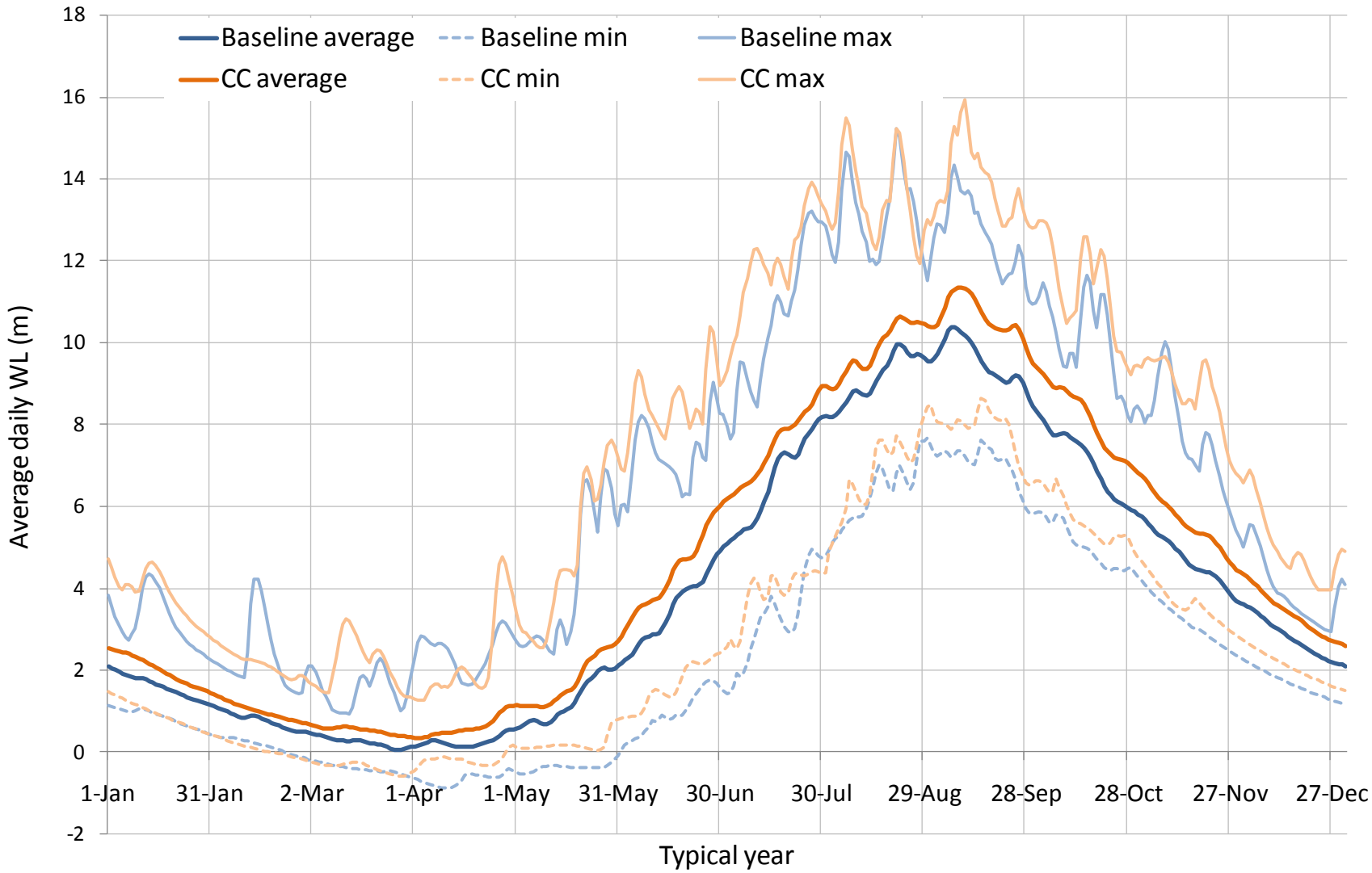
Vientiane – Flow



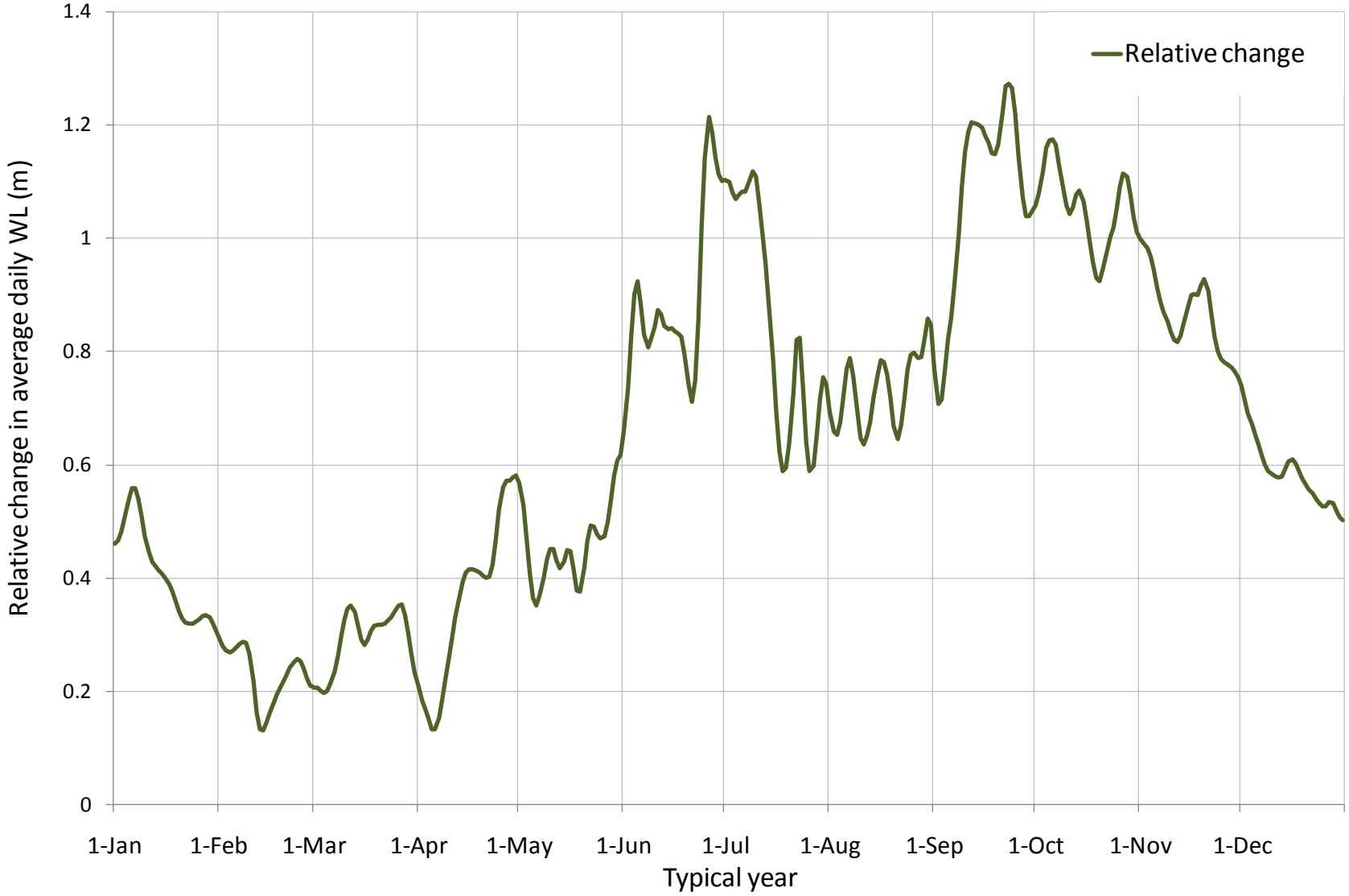
Vientiane – Flow



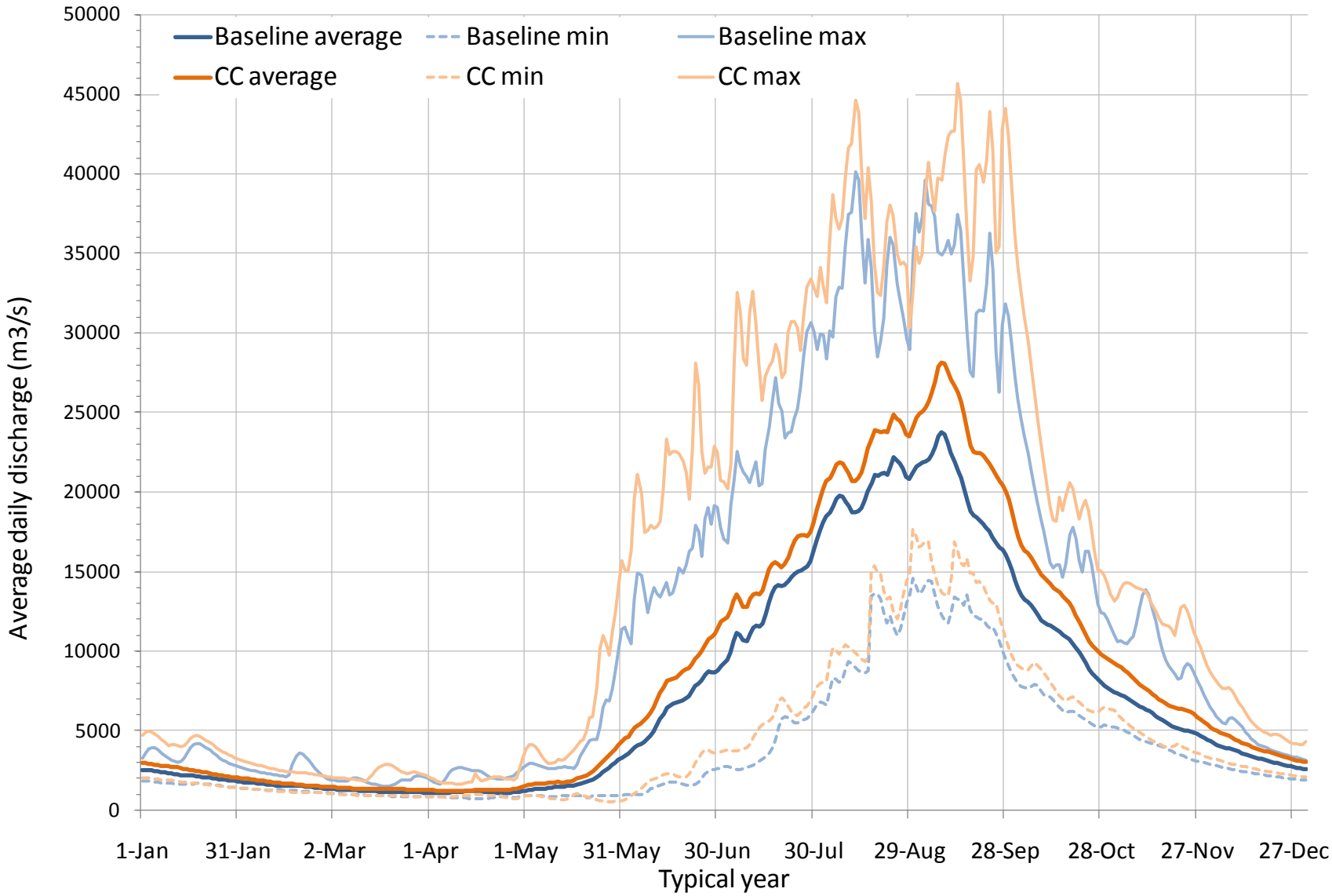
Vientiane – Water level



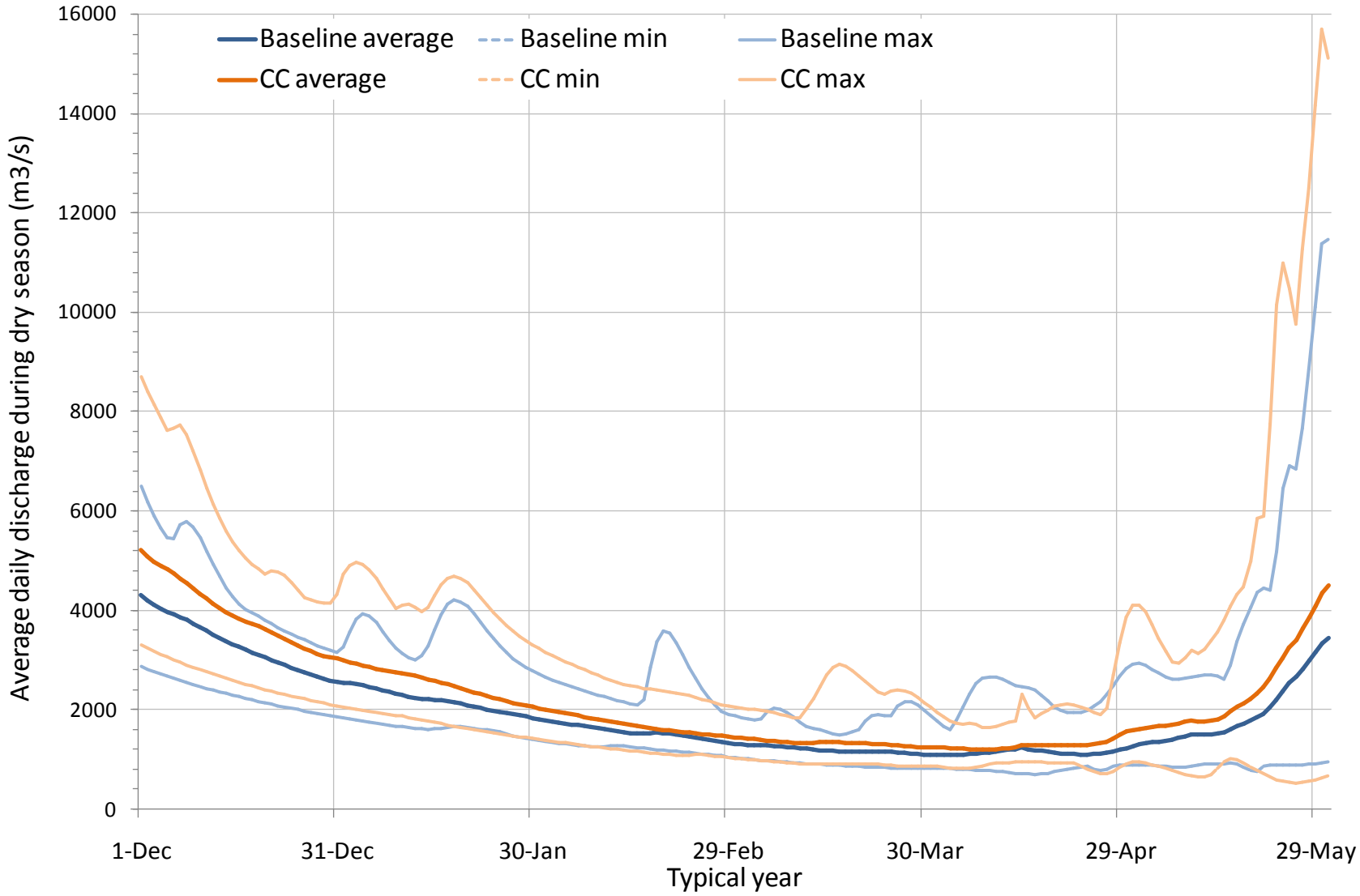
Vientiane – Water level



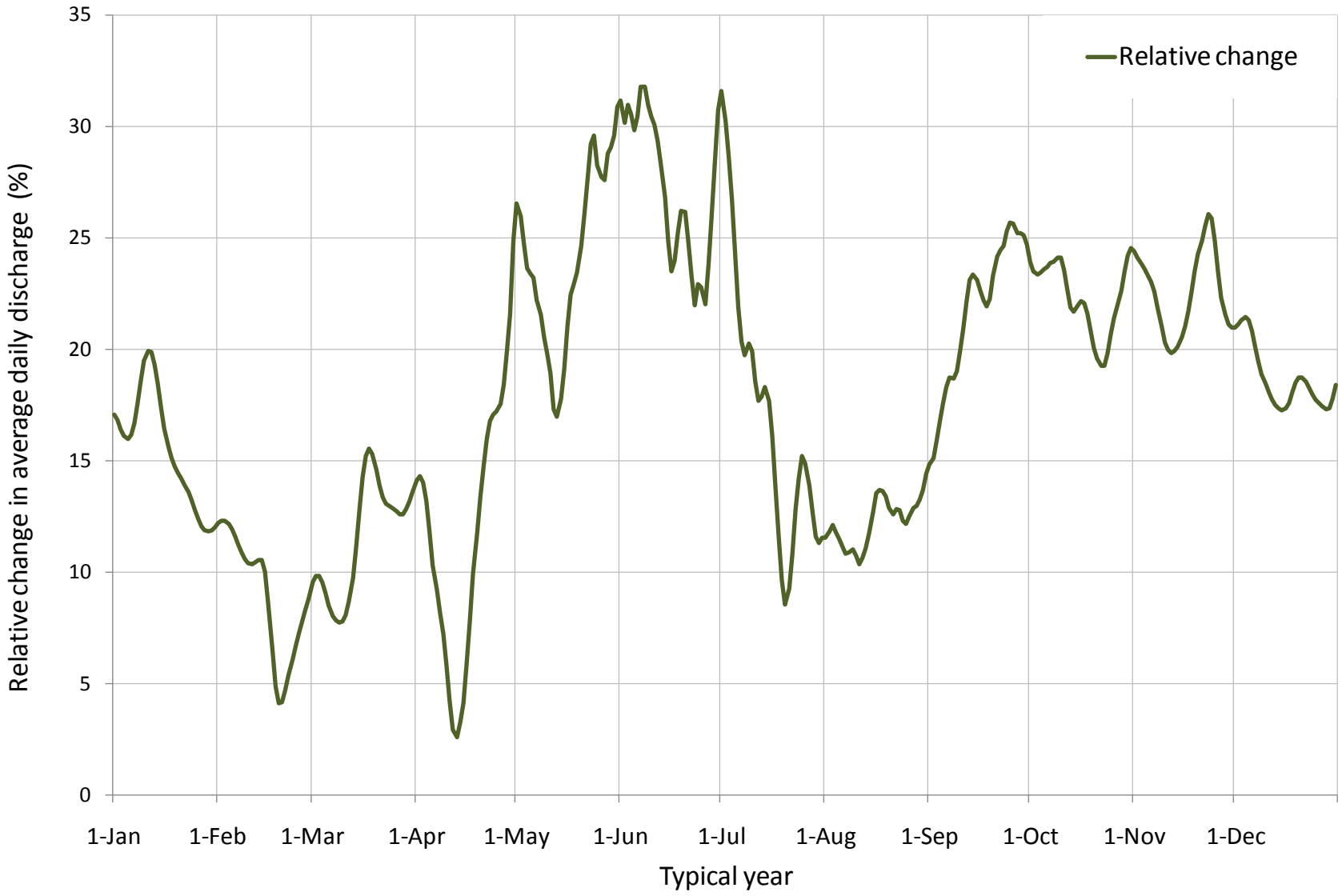
Nakhom Phanom – Flow



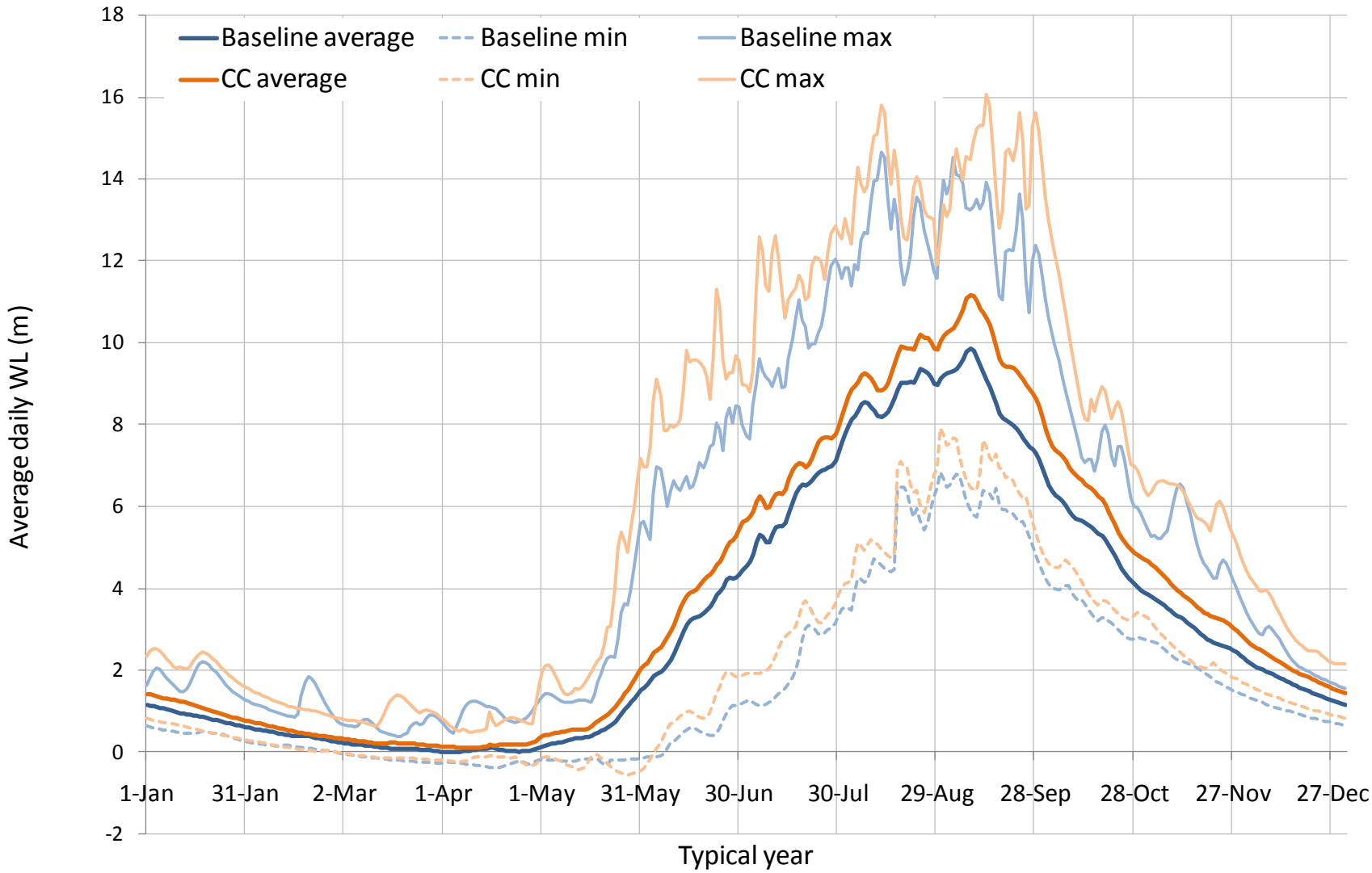
Nakhom Phanom – Flow



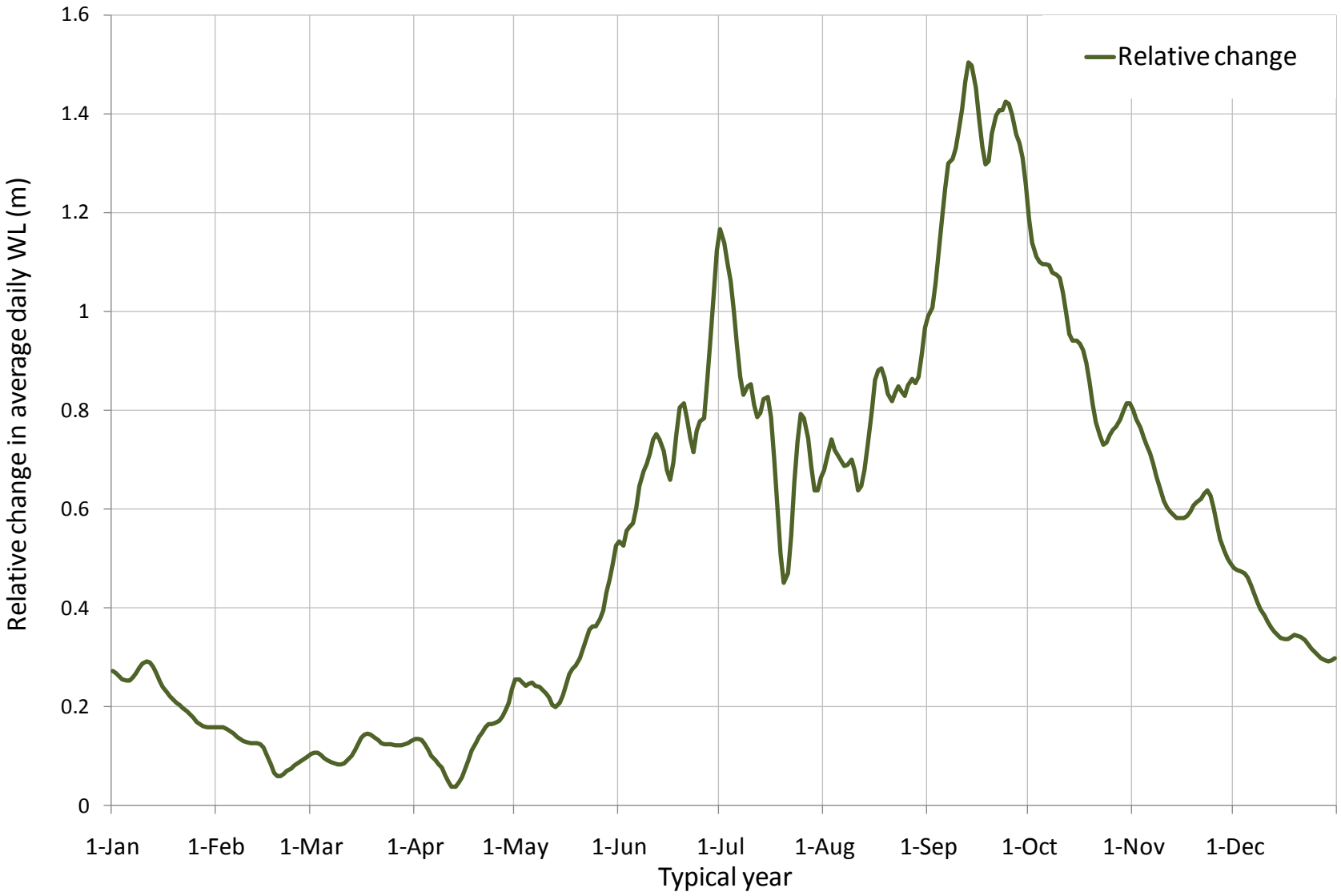
Nakhom Phanom – Flow



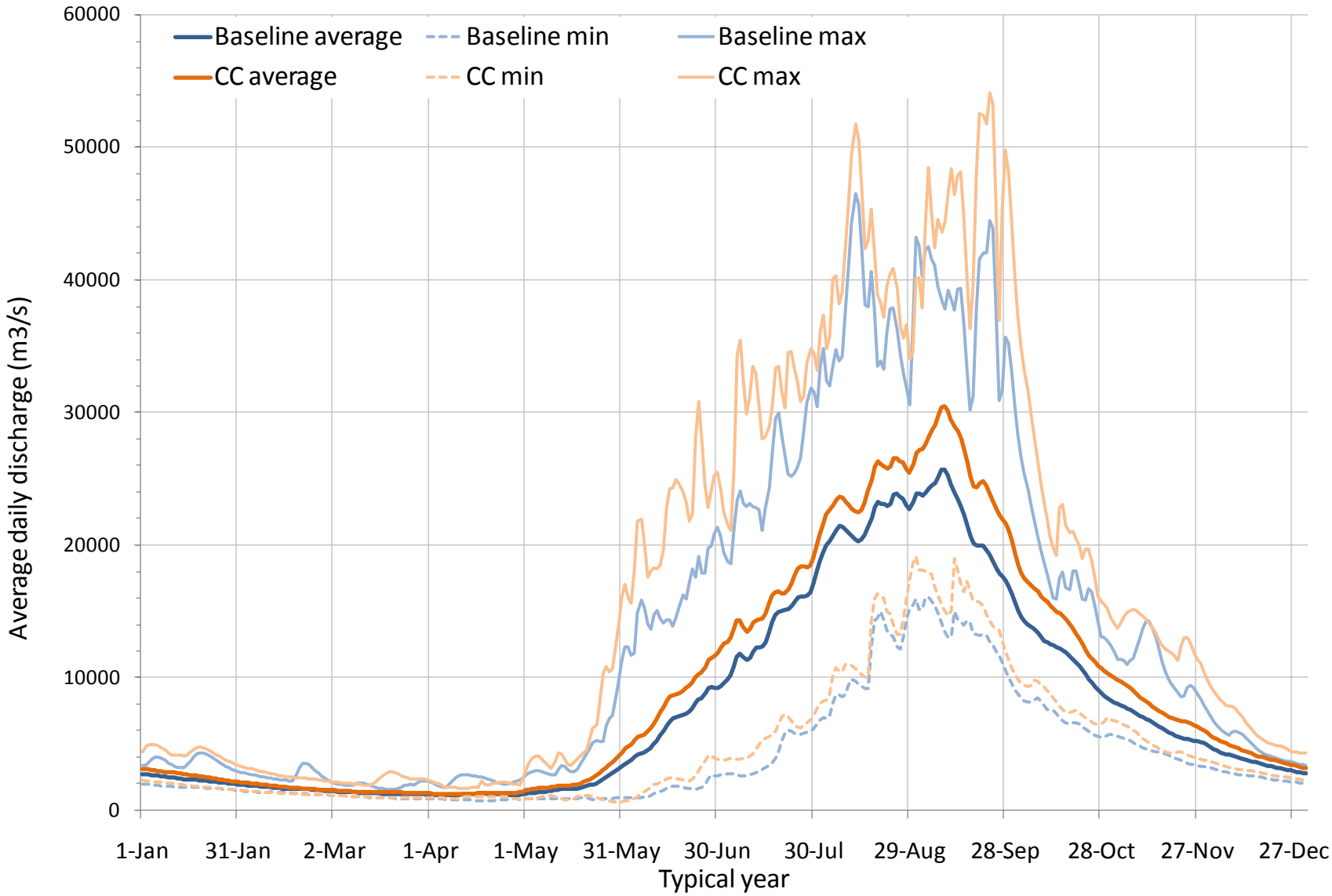
Nakhom Phanom – Water level



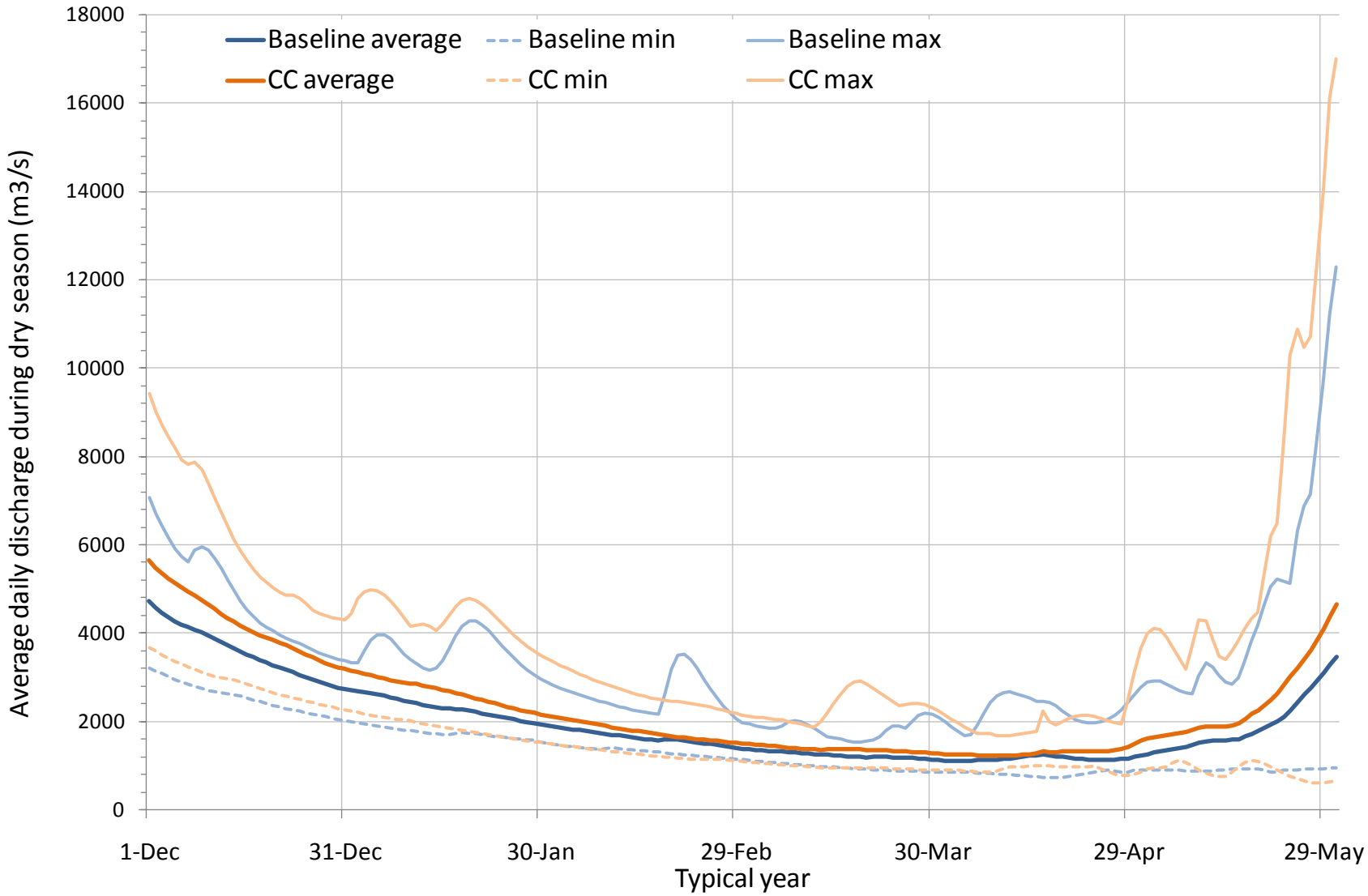
Nakhom Phanom – Water level



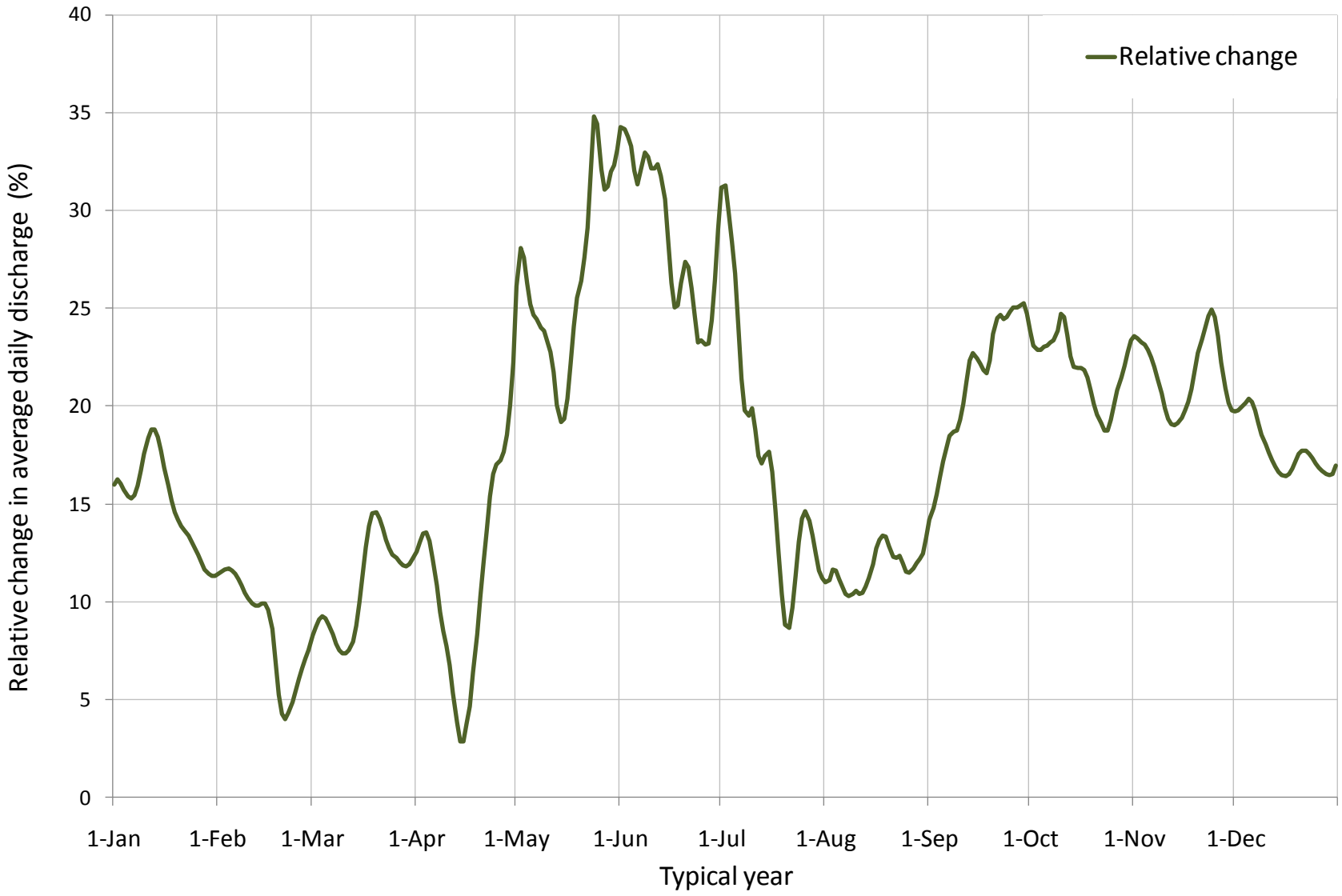
Mukdahan – Flow



Mukdahan – Flow



Mukdahan – Flow



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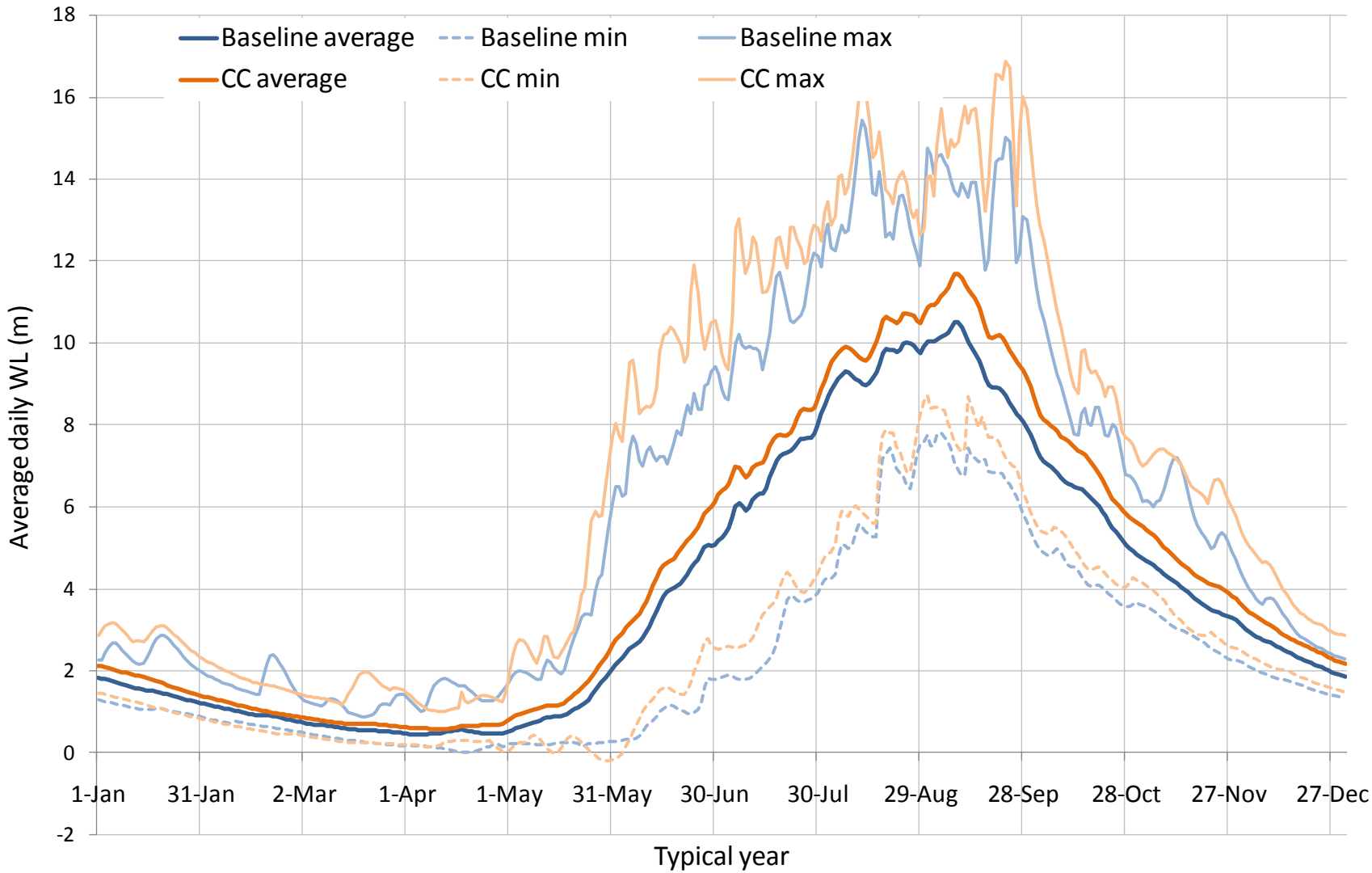
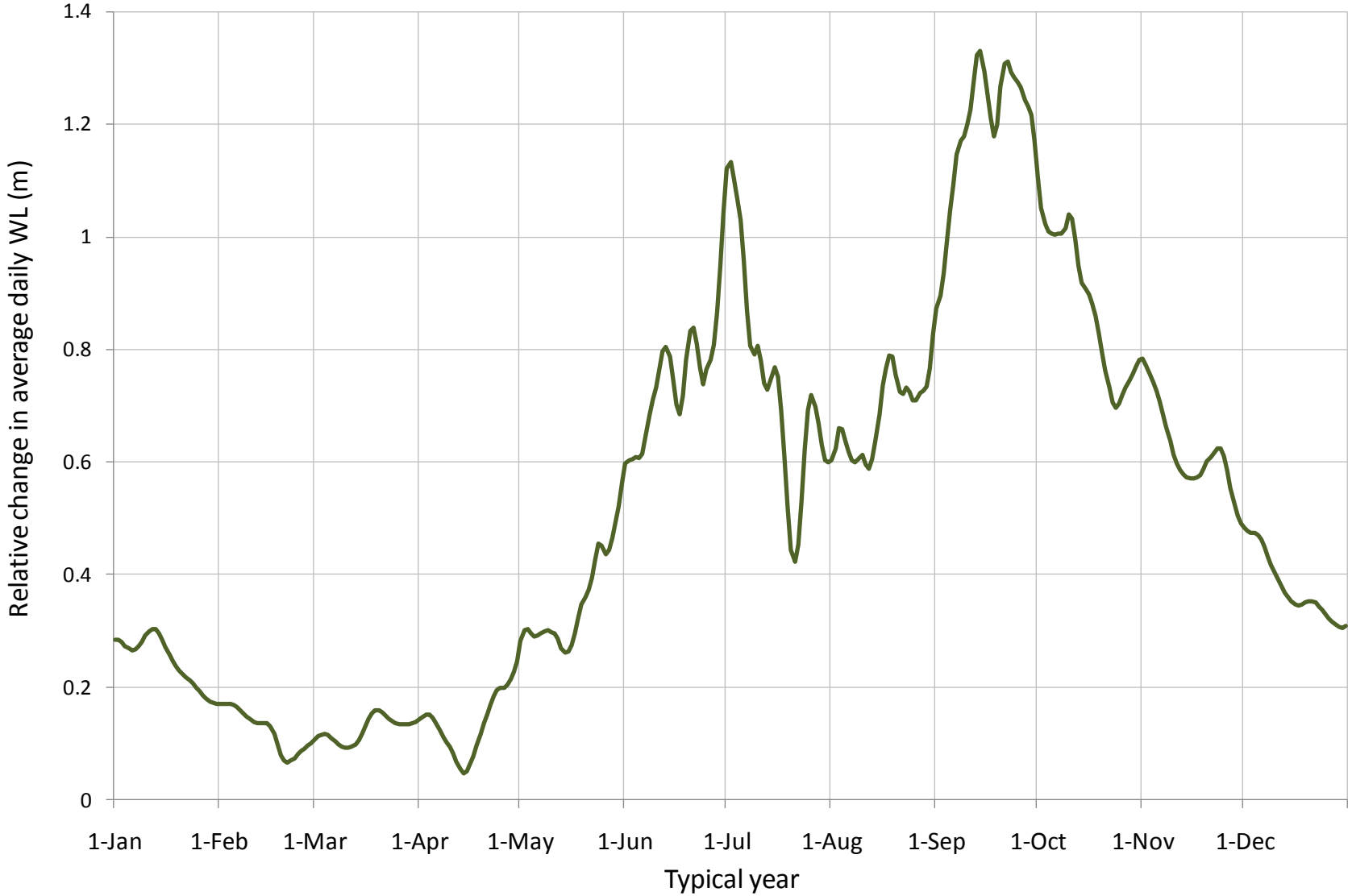
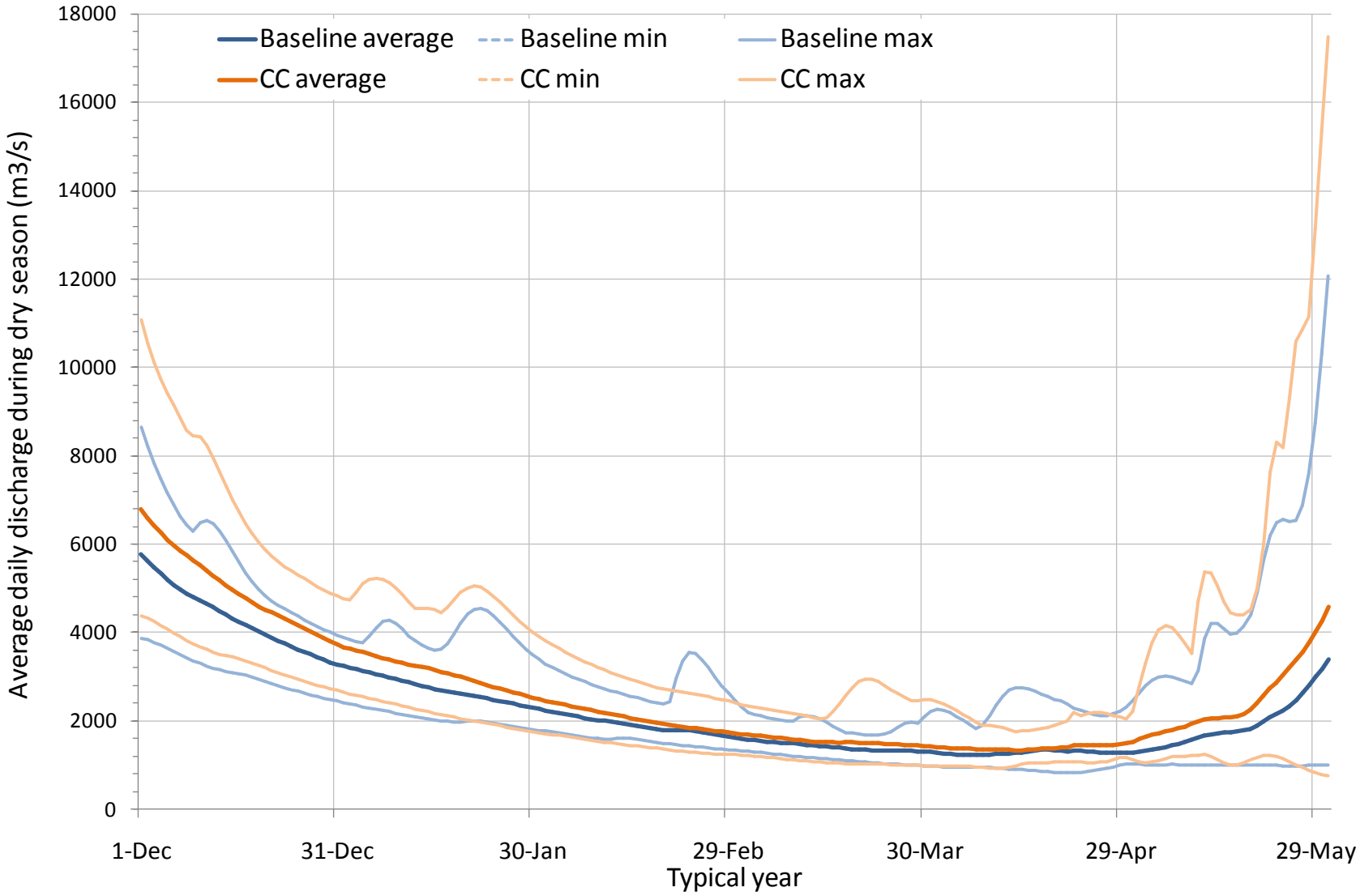


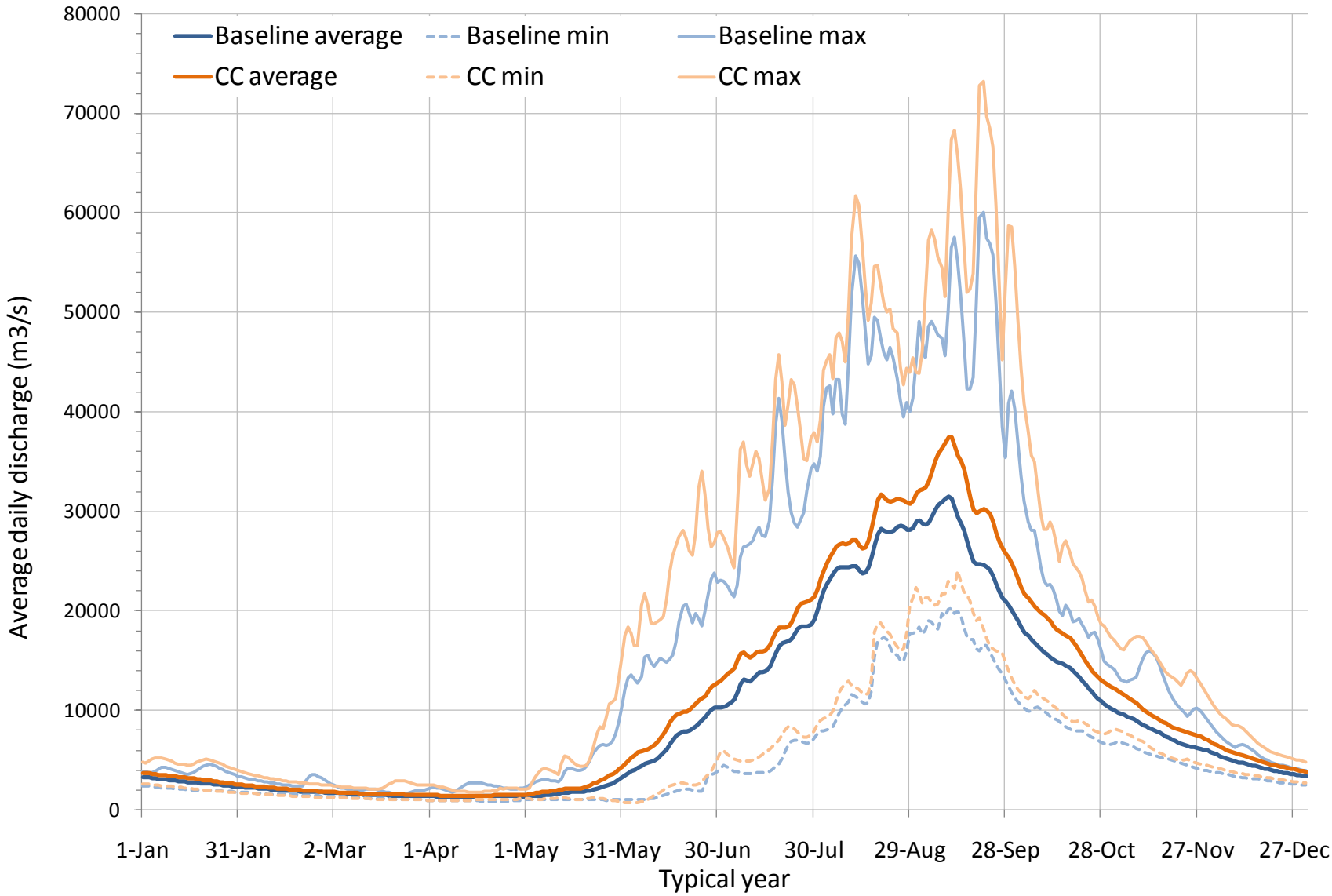
Mukdahan – Water level



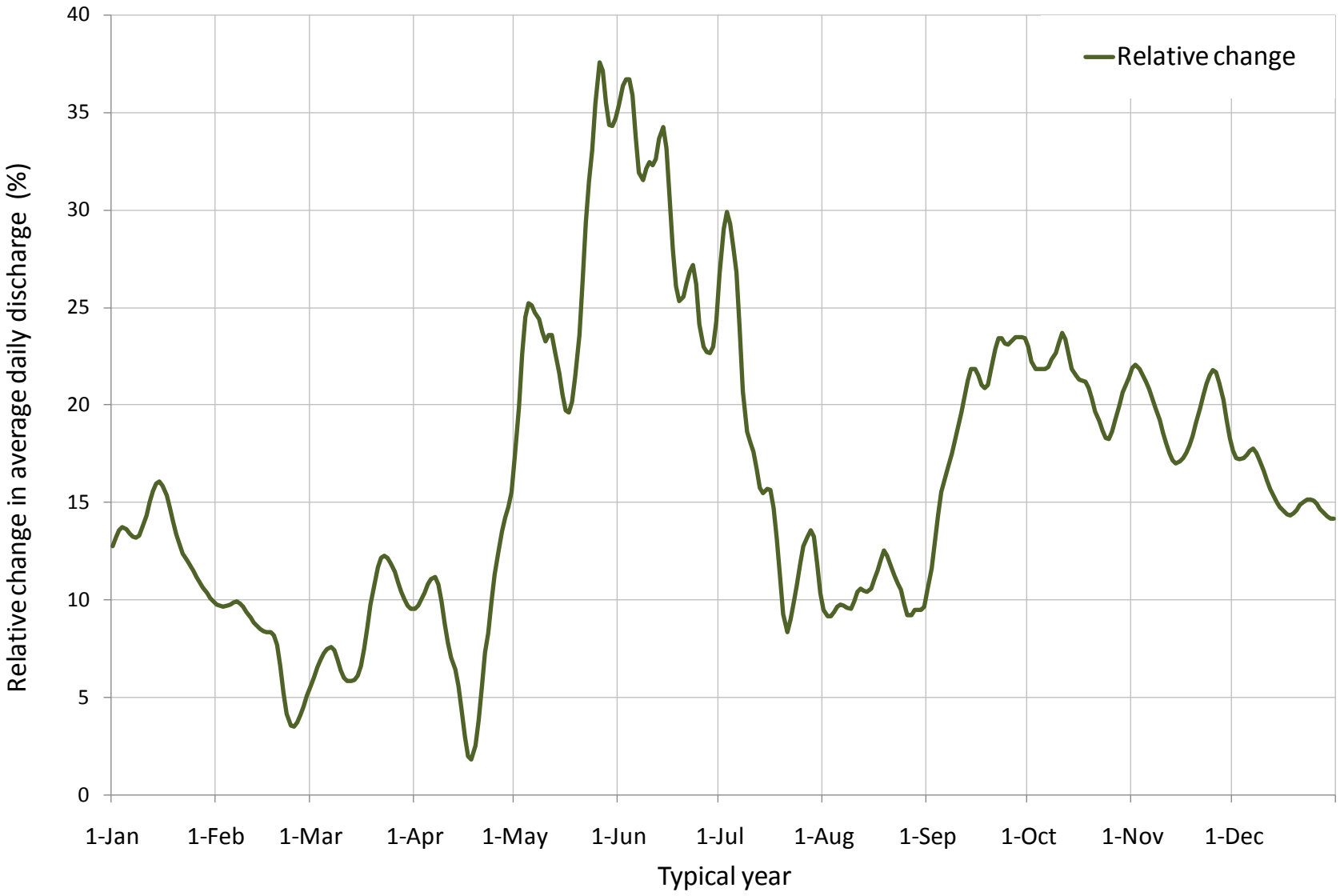
Pakse – Flow


Baseline average
Baseline min
Baseline max
CC average
CC min
CC max
Average daily discharge during dry season (m3/s)
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
1-Dec
31-Dec
30-Jan
29-Feb
30-Mar
29-Apr
29-May
Typical year

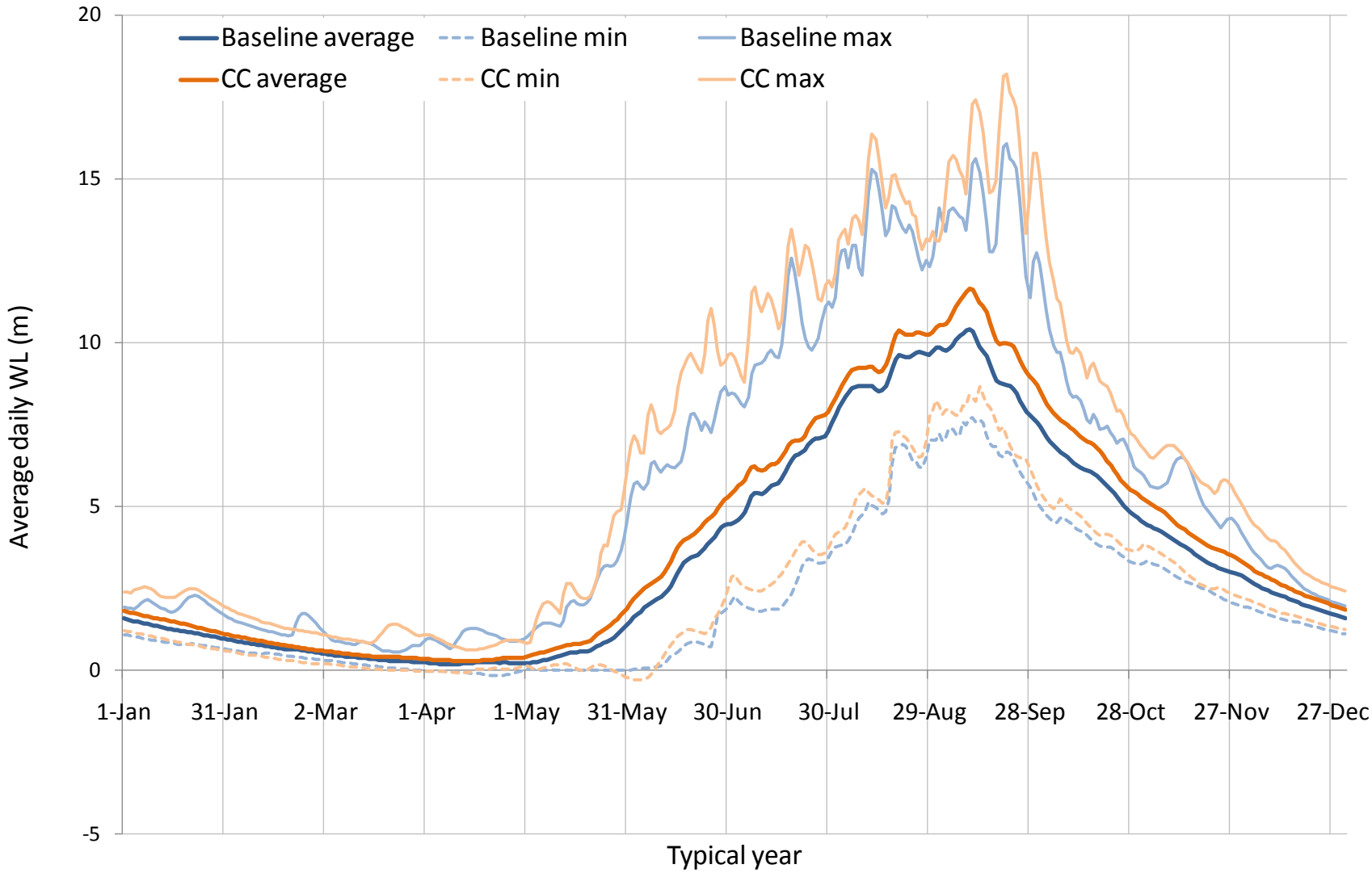
Pakse – Flow


Baseline average
Baseline min
Baseline max
CC average
CC min
CC max
Average daily discharge (m3/s)
80000
70000
60000
50000
40000
30000
20000
10000
0
1-Jan
31-Jan
2-Mar
1-Apr
1-May
31-May
30-Jun
30-Jul
29-Aug
28-Sep
28-Oct
27-Nov
27-Dec
Typical year

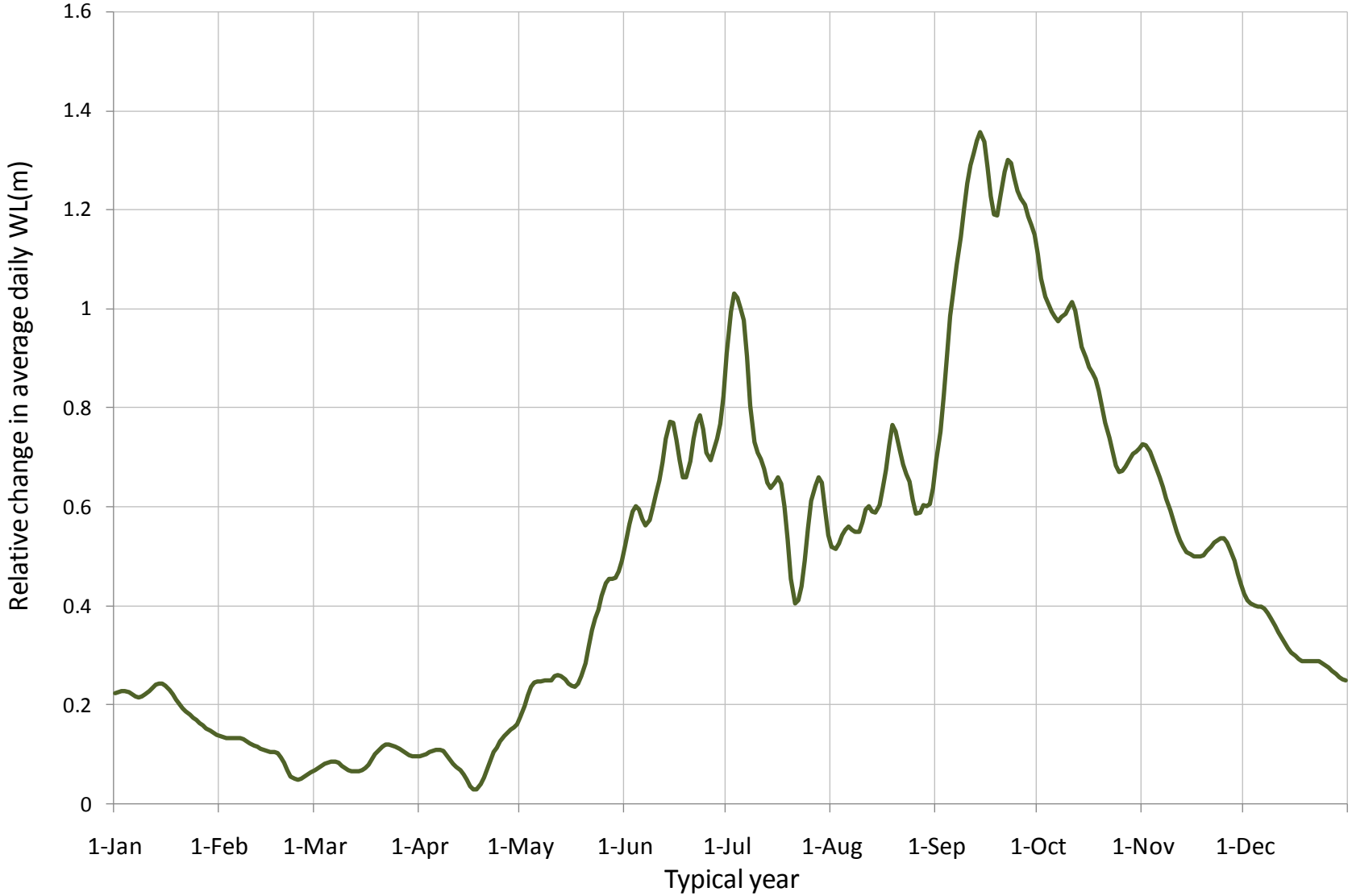
Pakse – Flow


Relative change
Relative change in average daily discharge (%)
40
35
30
25
20
15
10
5
0
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
Typical year

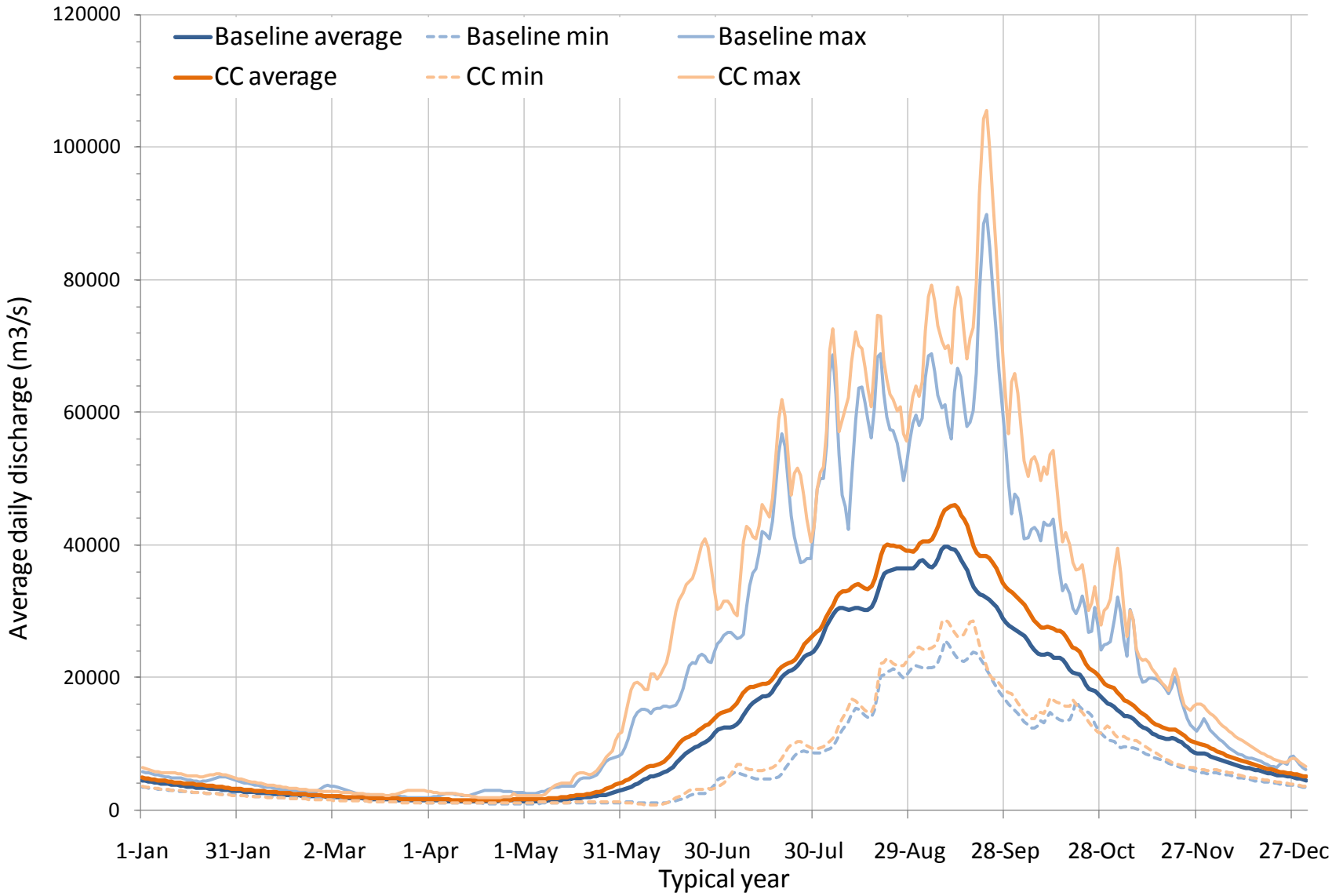
Pakse – Water level



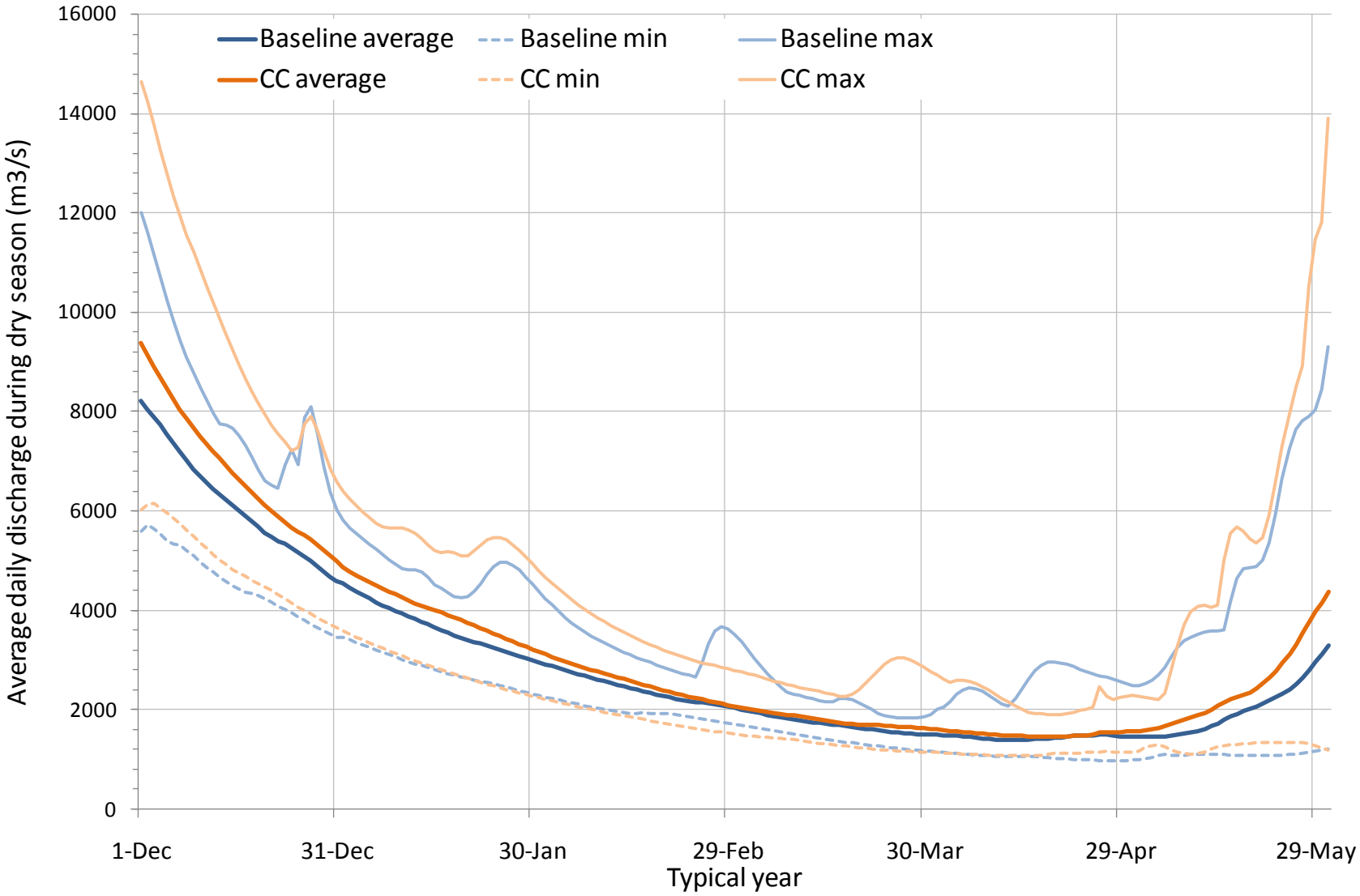
Pakse – Water level



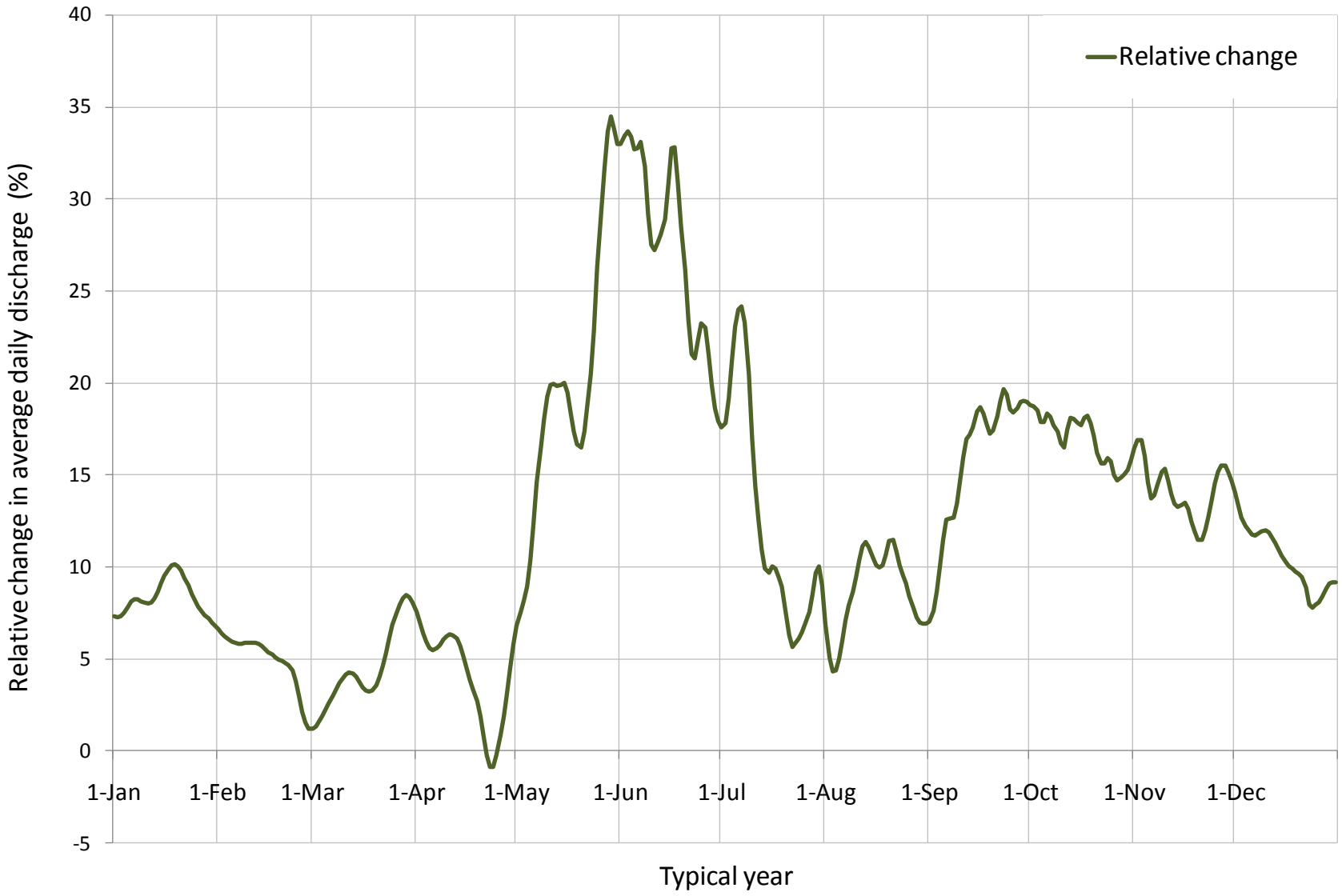
Kratie – Flow


Baseline average
Baseline min
Baseline max
CC average
CC min
CC max
Average daily discharge (m3/s)
120000
100000
80000
60000
40000
20000
0
1-Jan
31-Jan
2-Mar
1-Apr
1-May
31-May
30-Jun
30-Jul
29-Aug
28-Sep
28-Oct
27-Nov
27-Dec
Typical year

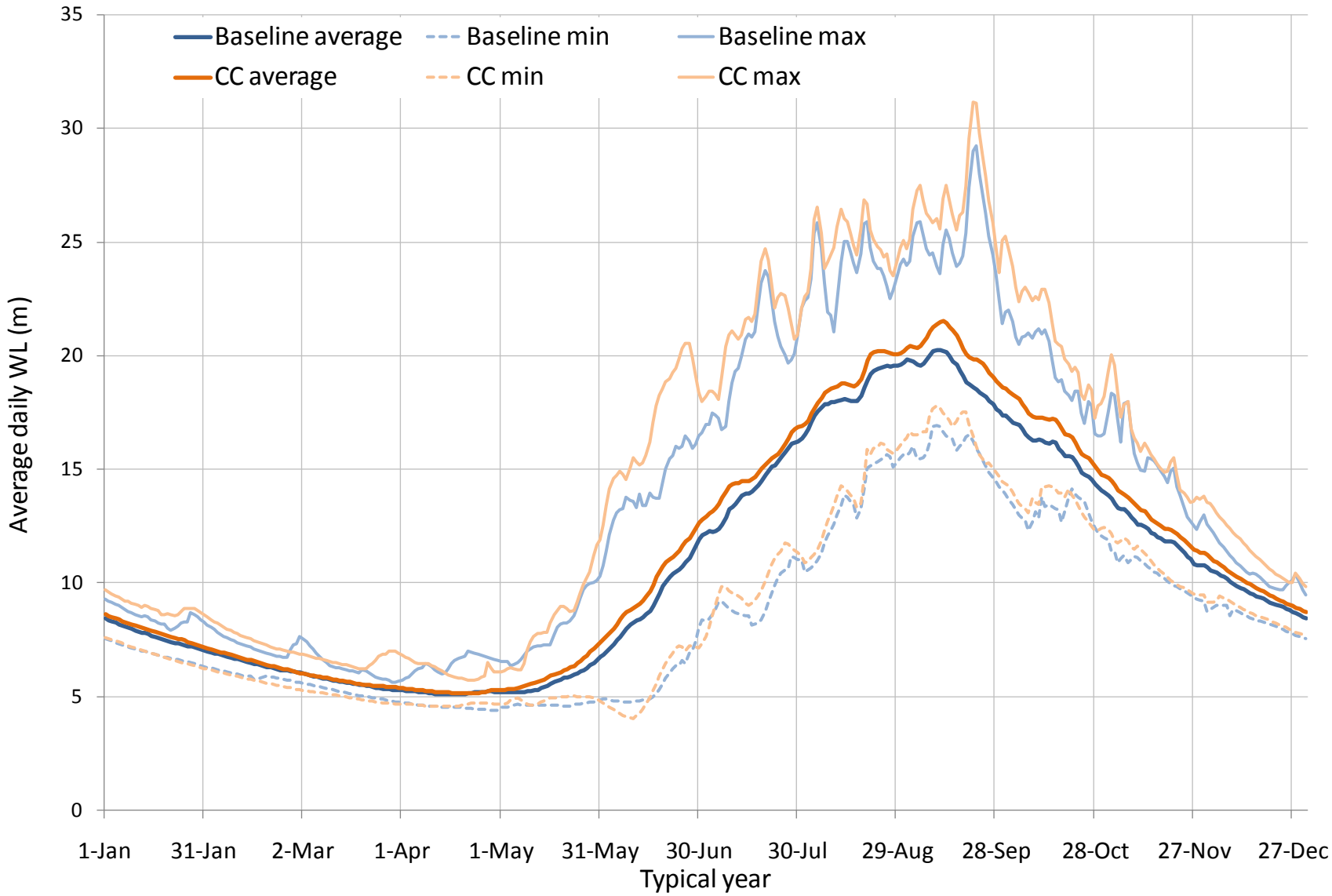
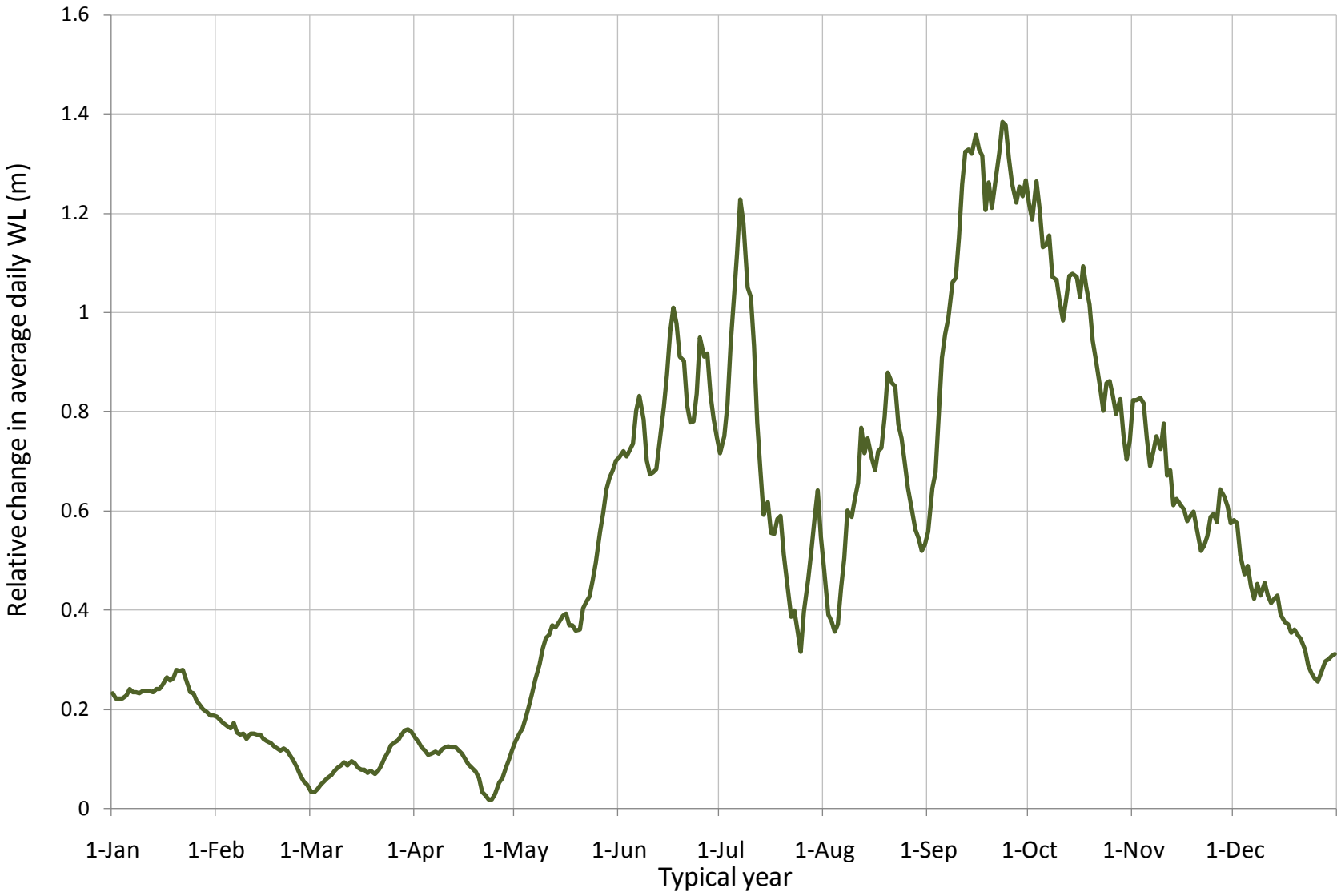
Kratie – Flow


Baseline average
Baseline min
Baseline max
CC average
CC min
CC max
Average daily discharge during dry season (m3/s)
16000
14000
12000
10000
8000
6000
4000
2000
0
1-Dec
31-Dec
30-Jan
29-Feb
30-Mar
29-Apr
29-May
Typical year

Kratie – Flow


Relative change
Relative change in average daily discharge (%)
40
35
30
25
20
15
10
5
0
-5
1-Jan
1-Feb
1-Mar
1-Apr
1-May
1-Jun
1-Jul
1-Aug
1-Sep
1-Oct
1-Nov
1-Dec
Typical year

Kratie – Water level



Kratie – Water level