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Supplement of

Assessing the degree of detail of temperature-based snow routines for runoff modelling in mountainous areas in central Europe

Marc Girons Lopez et al.

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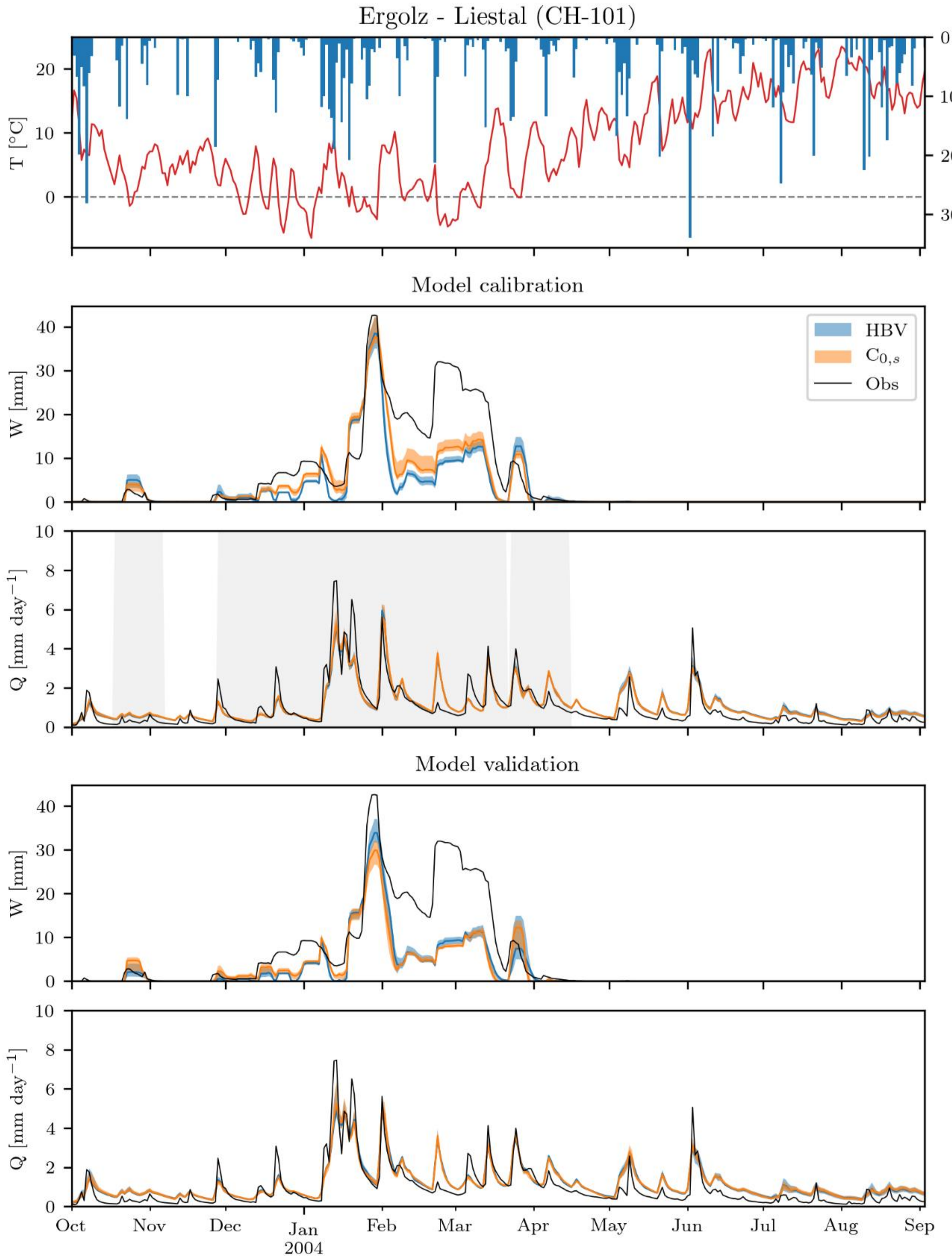
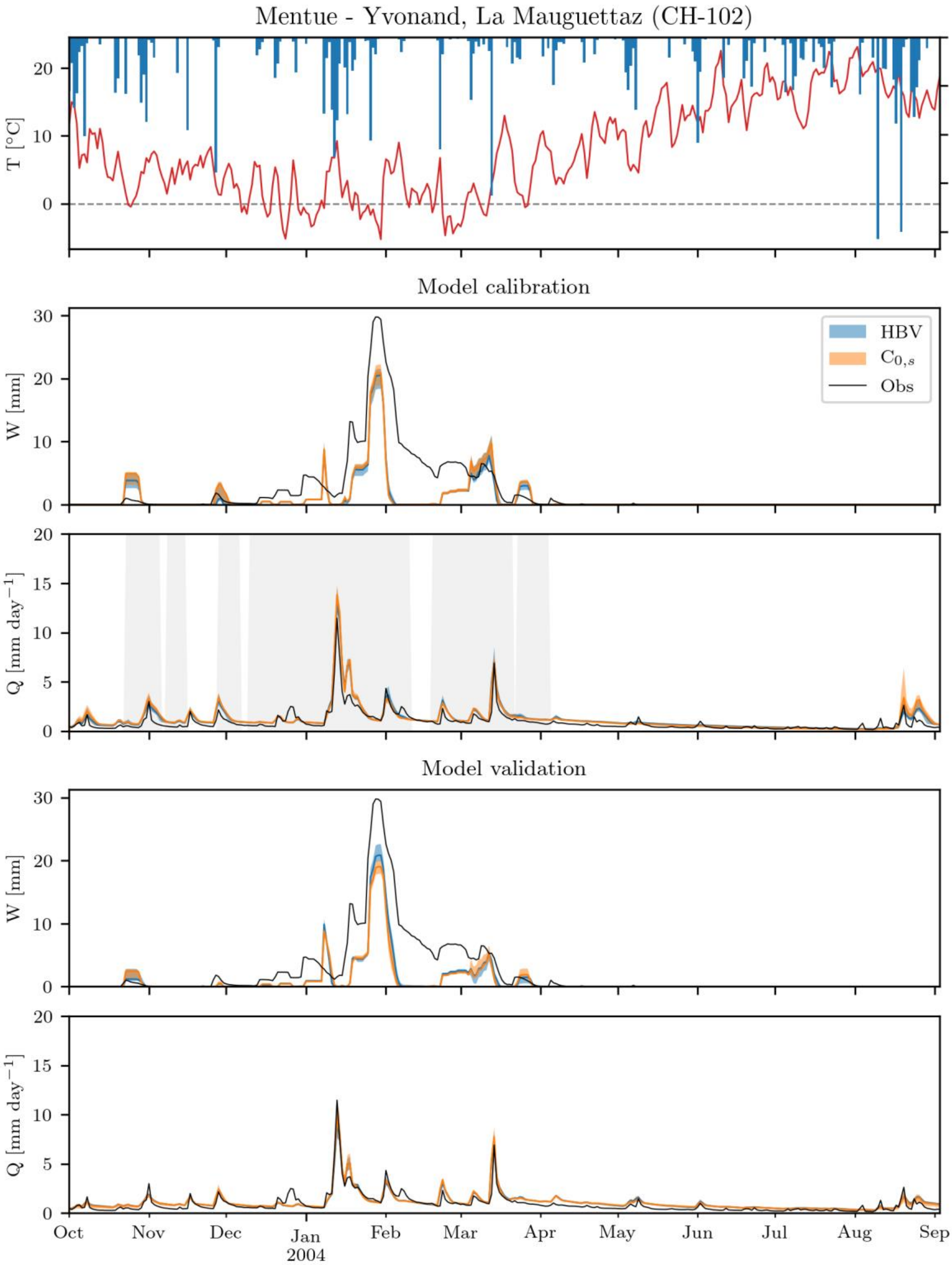


Figure S1 Time series (October 2003 – September 2004) for the Ergolz catchment at Liestal (CH-101). Top: daily mean air temperature and total precipitation. Middle: model calibration results for period 1. Bottom: model validation results (based on model calibration on period 2). The model calibration and validation are further subdivided into (top) catchment-average observed (grey line) and simulated snow water equivalent (HBV in blue and the model structure modification including a seasonally varying degree-day factor, *$C_{0,s}$*, in orange), and (bottom) observed (grey line) and simulated stream runoff (HBV in blue and the model structure modification including a seasonal degree-day factor in orange). The grey field represents the period used when calibrating the model against the logarithmic stream runoff. The uncertainty fields for model simulation cover the 10th – 90th percentile range, while the solid line represents the median value.



Mentue - Yvonand, La Mauguettaz (CH-102)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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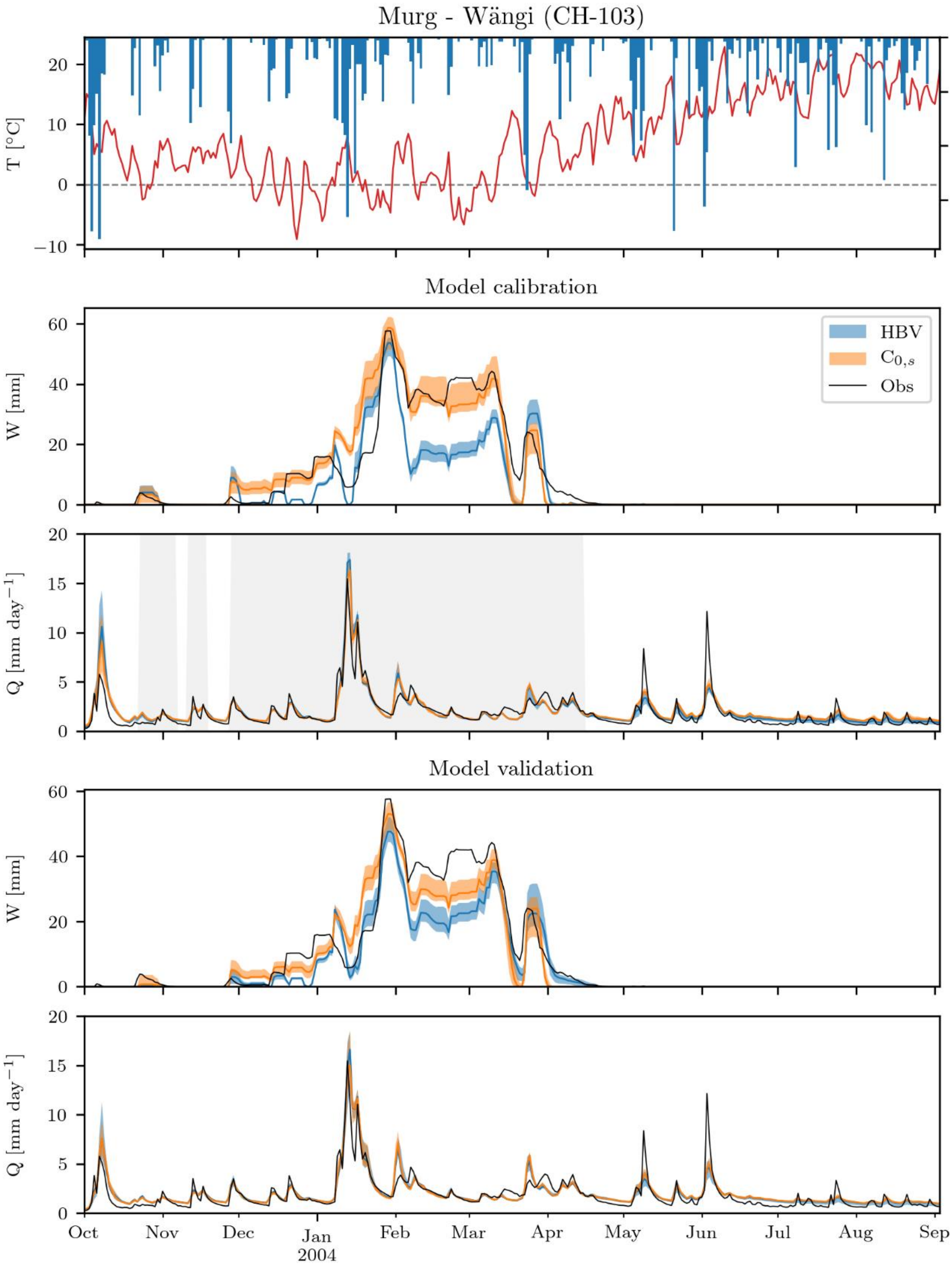
Murg - Wängi (CH-103)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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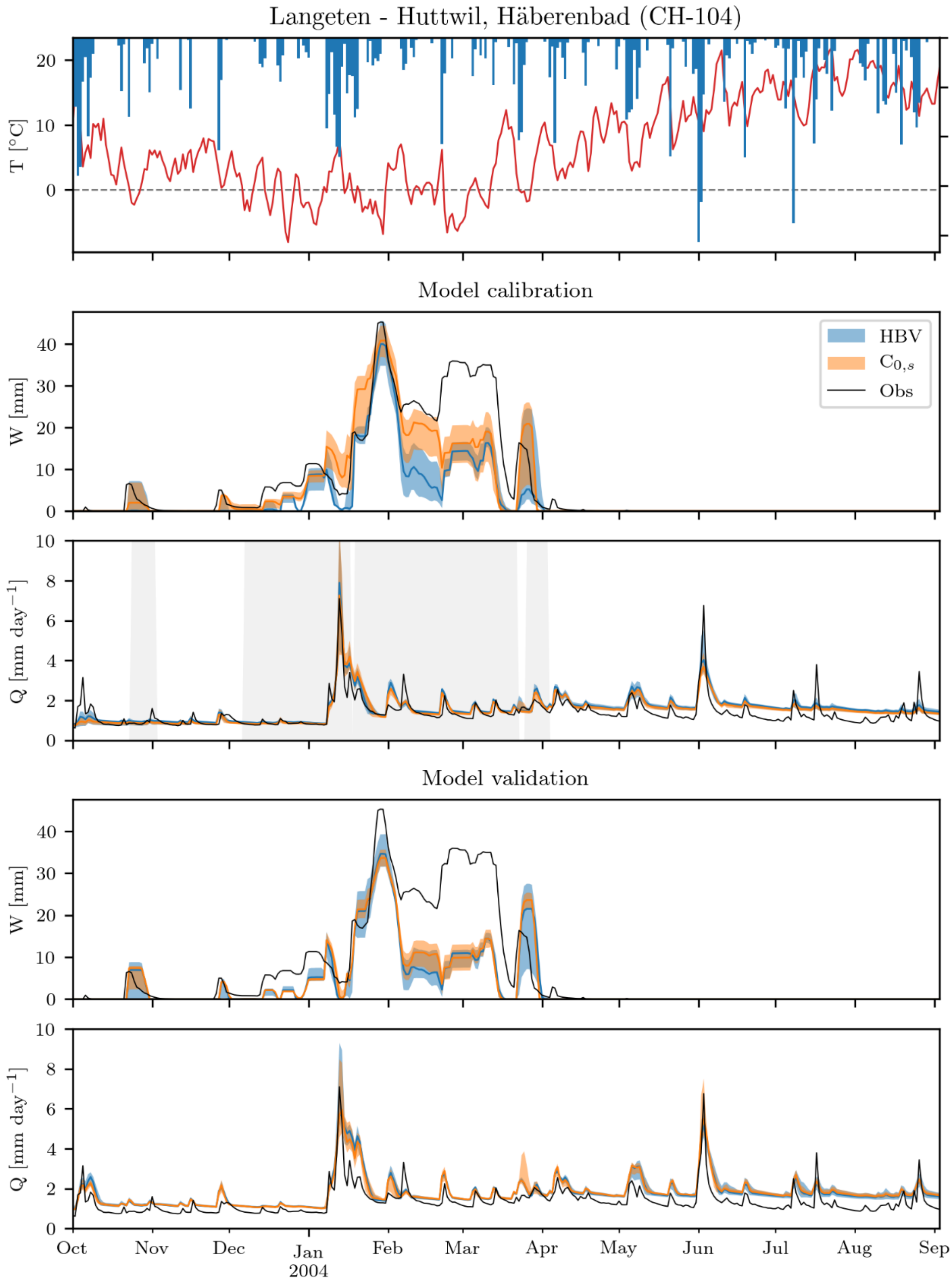

Langeten - Huttwil, Häberenbad (CH-104)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
C0,s
Obs
Q [mm day−1]
Model validation
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Q [mm day−1]
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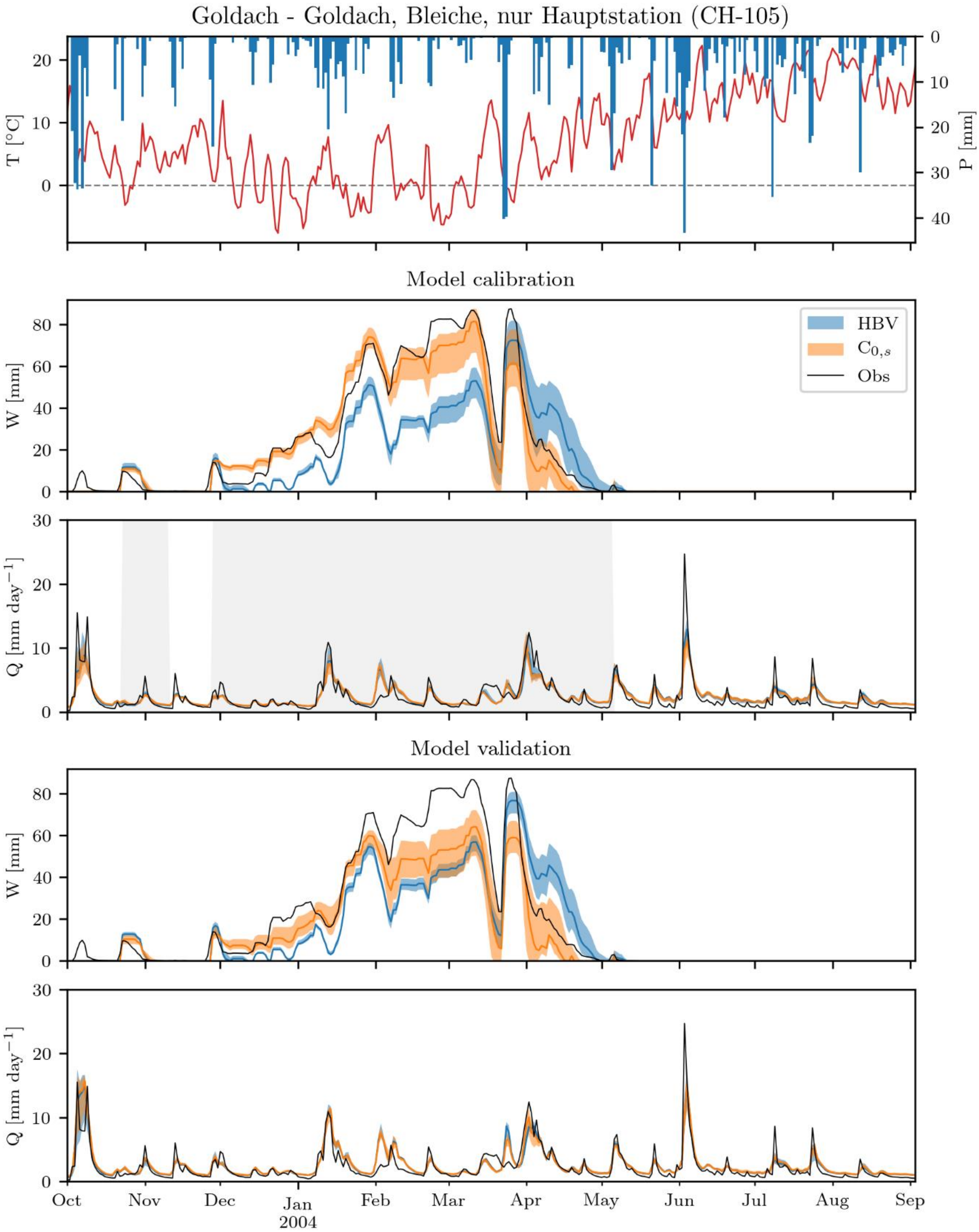

Goldach - Goldach, Bleiche, nur Hauptstation (CH-105)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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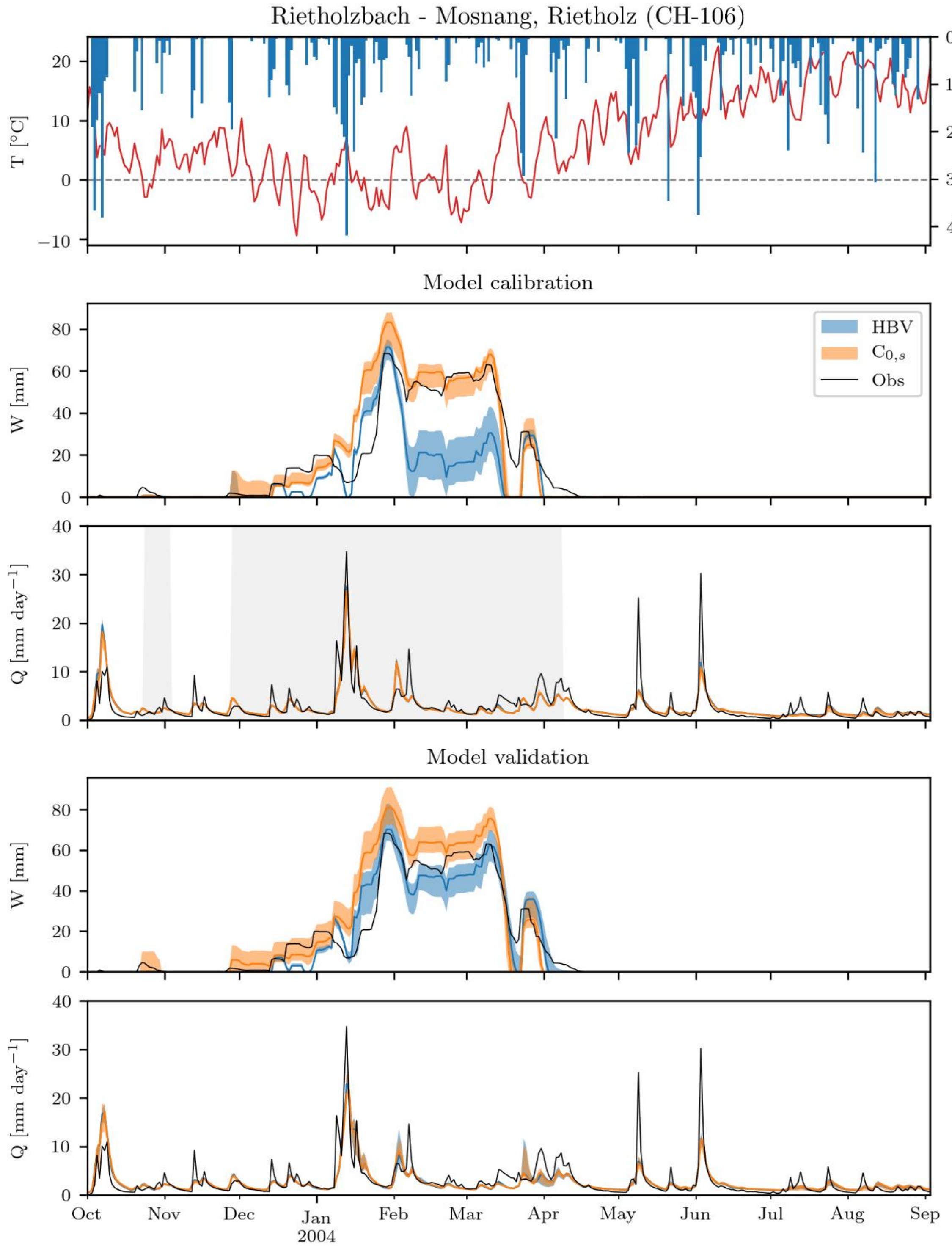

Rietholzbach - Mosnang, Rietholz (CH-106)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
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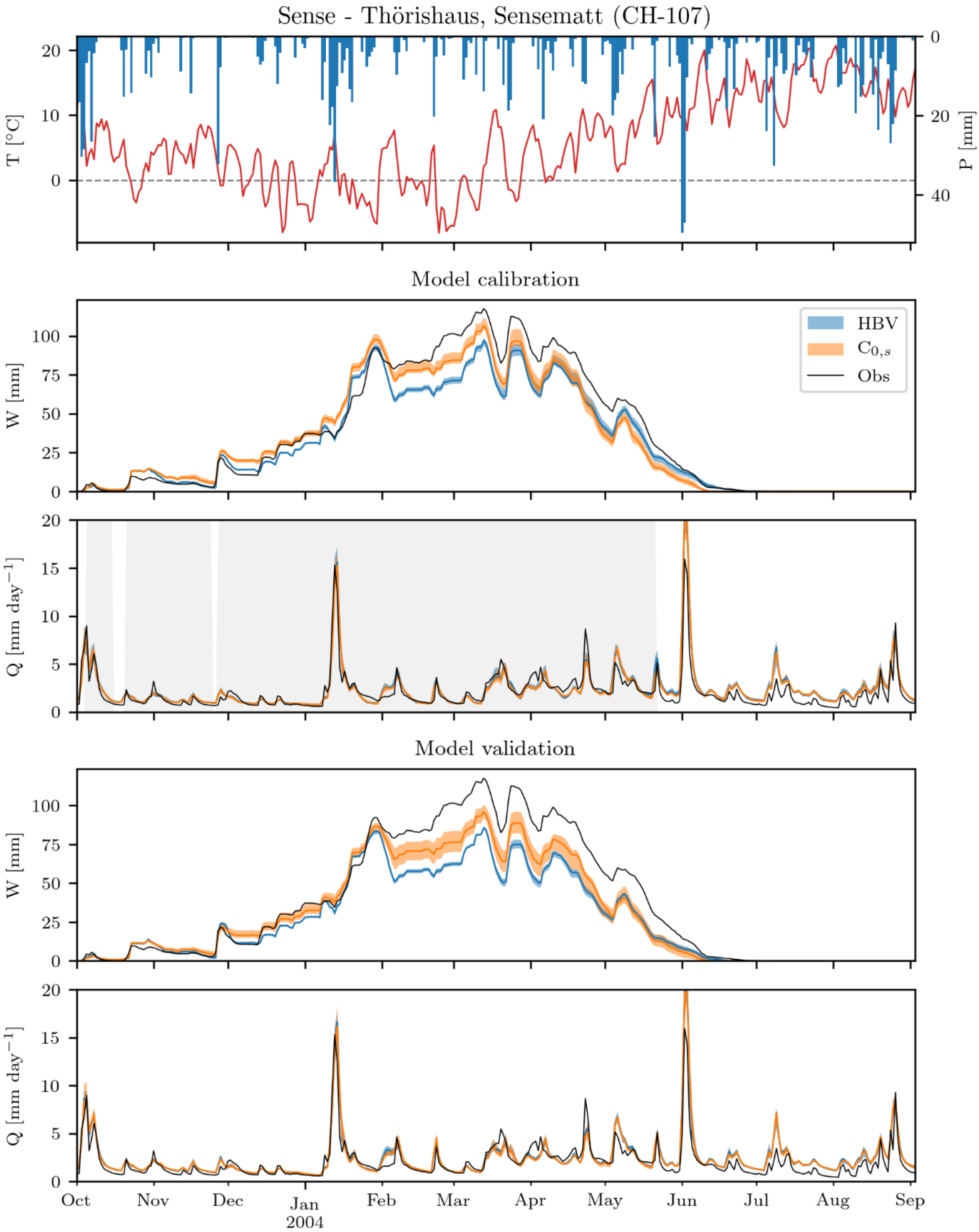

Sense - Thörishaus, Sensematt (CH-107)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
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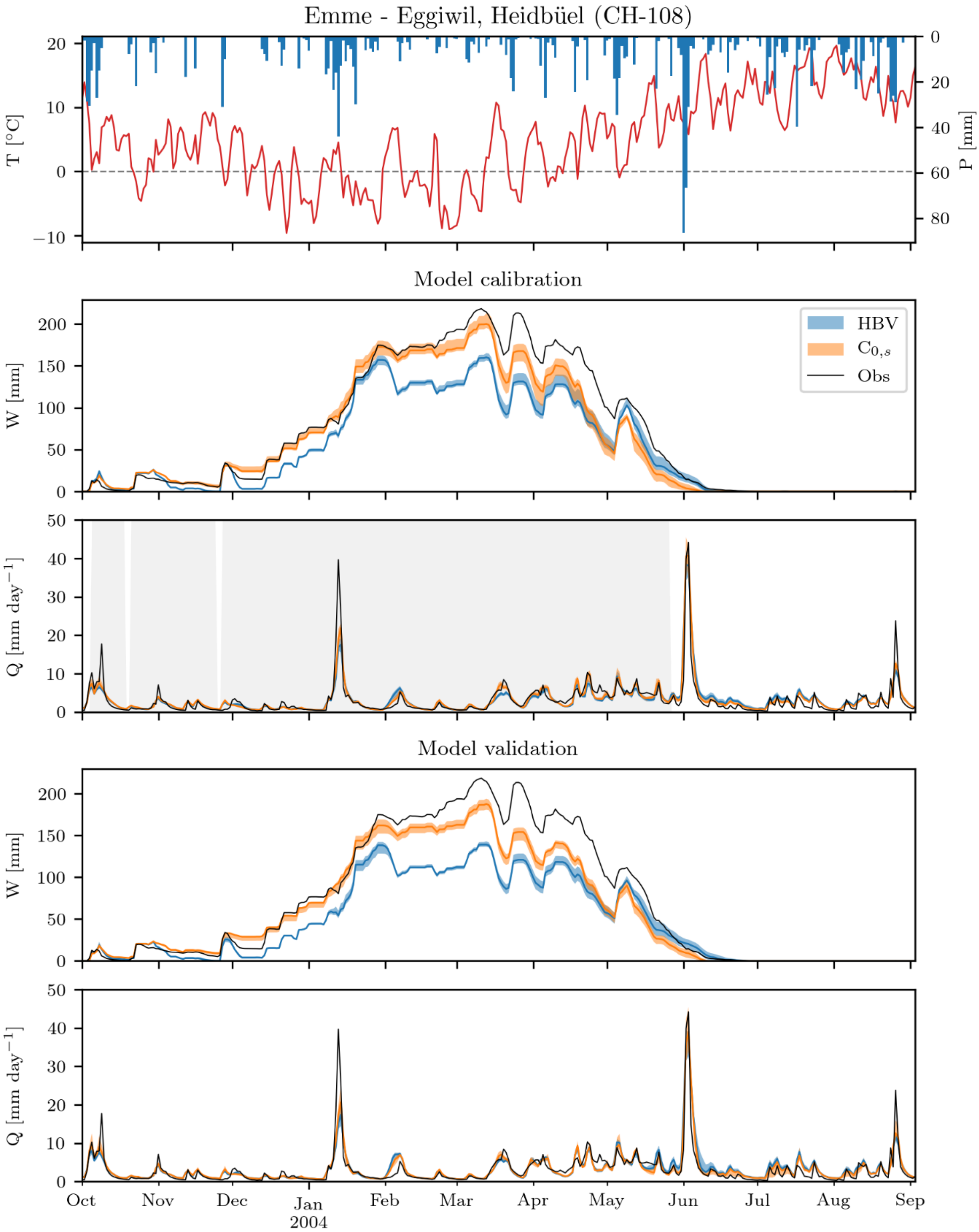
Emme - Eggiwil, Heidbüel (CH-108)
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P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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Q [mm day^{-1}]
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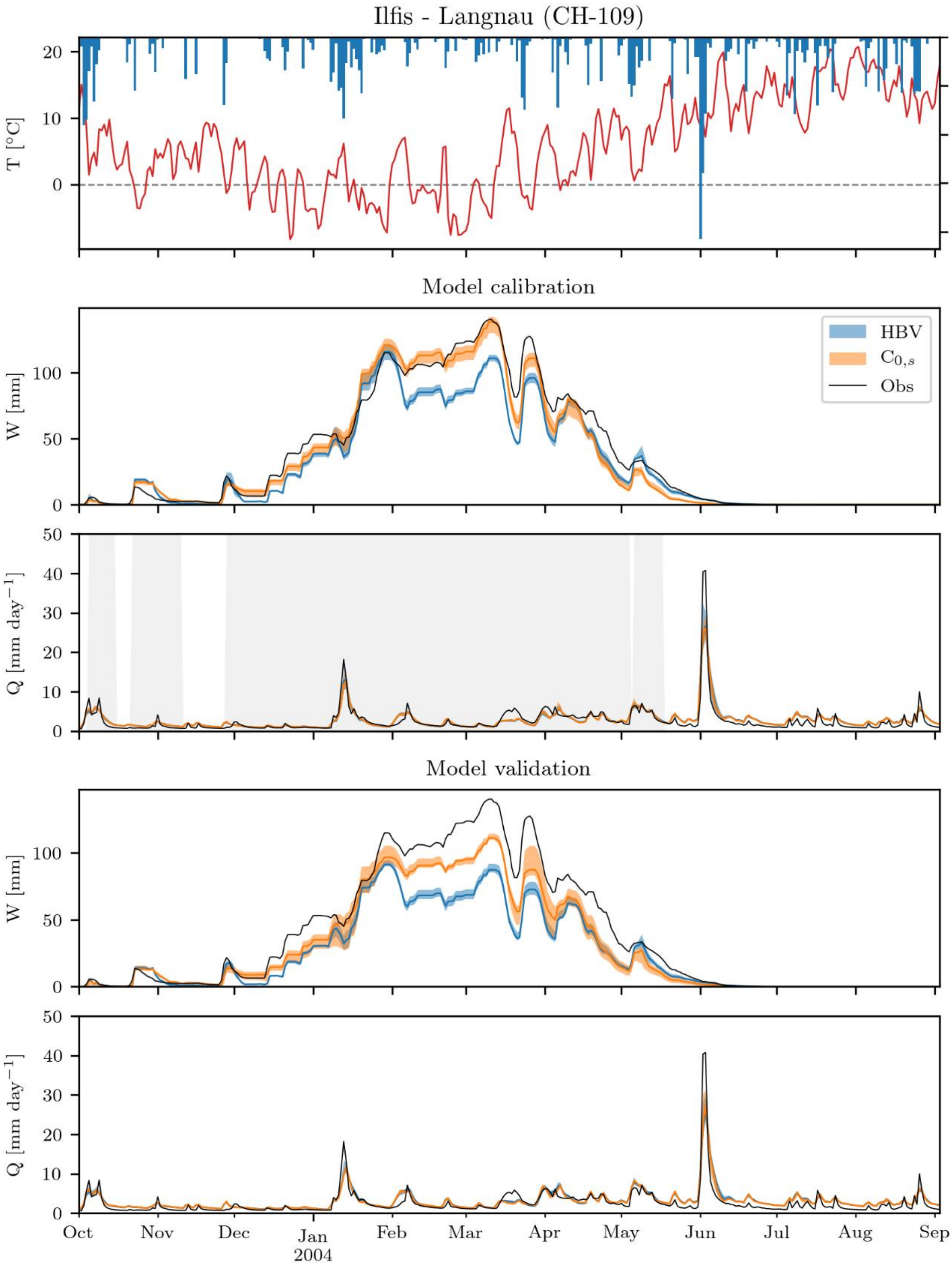

Ilfis - Langnau (CH-109)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
C0,s
Obs
Q [mm day−1]
Model validation
W [mm]
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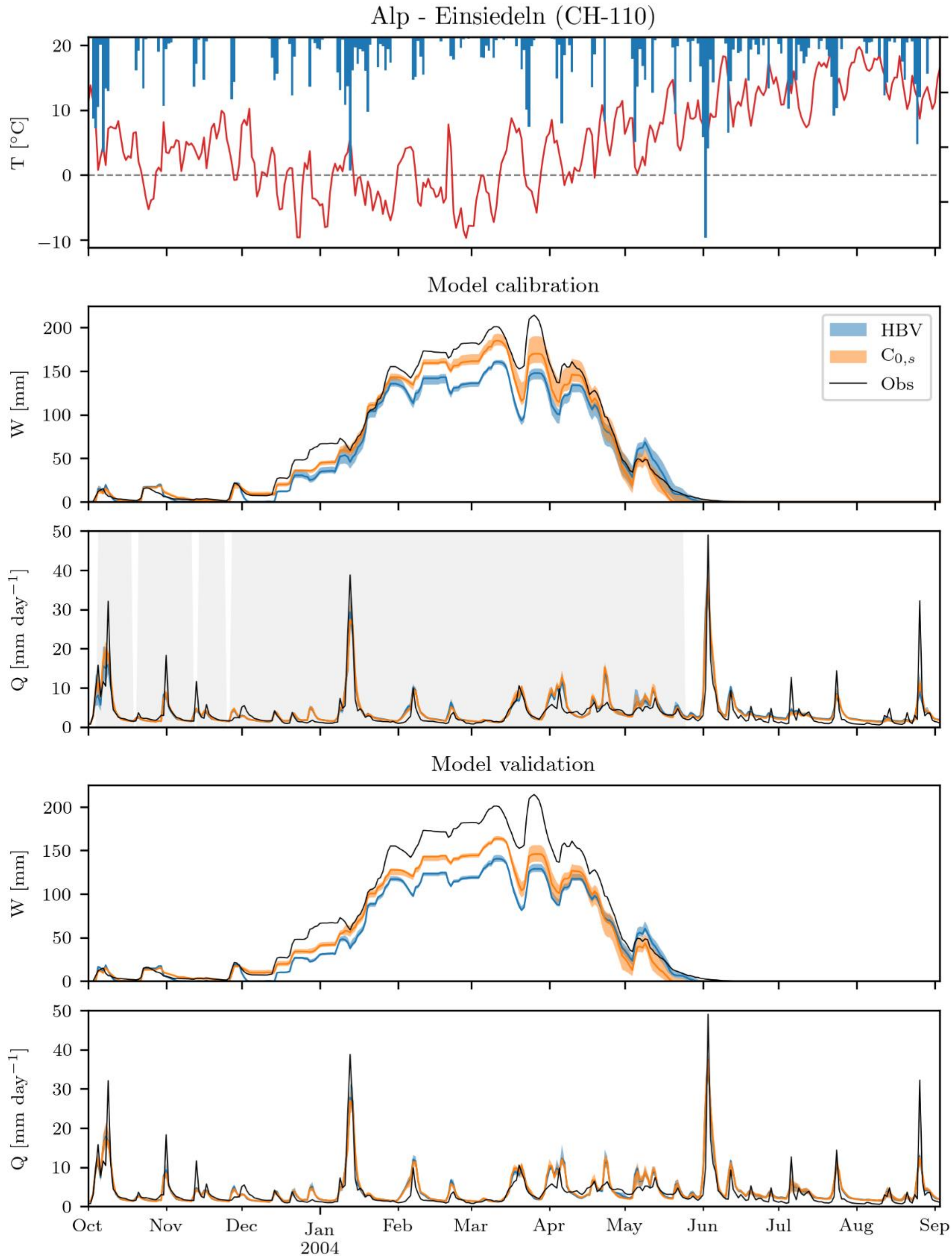

Alp - Einsiedeln (CH-110)
T [°C]
P [mm]
Model calibration
HBV
$C_{0,s}$
Obs
W [mm]
Q [mm day^{-1}]
Model validation
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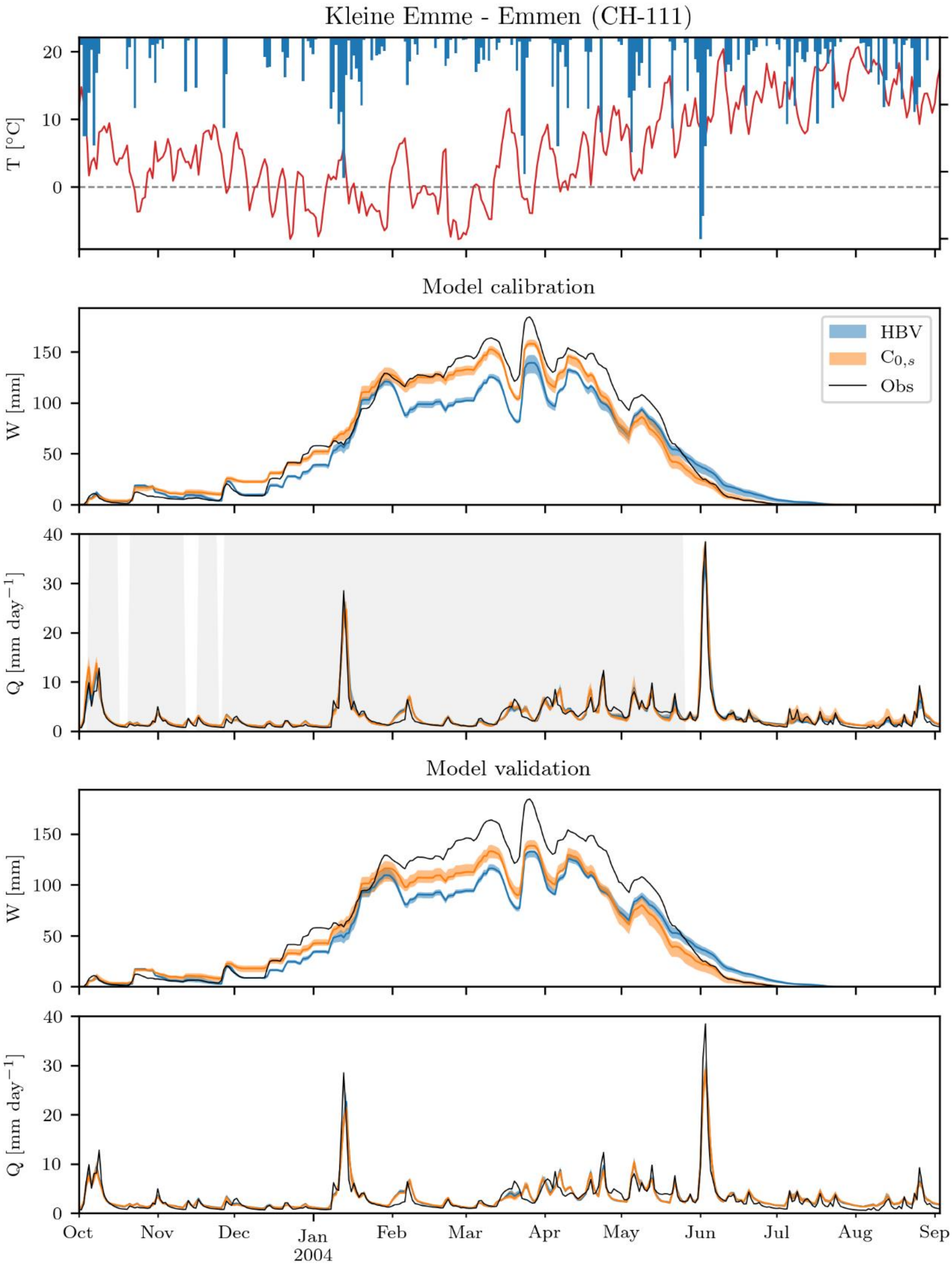

Kleine Emme - Emmen (CH-111)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
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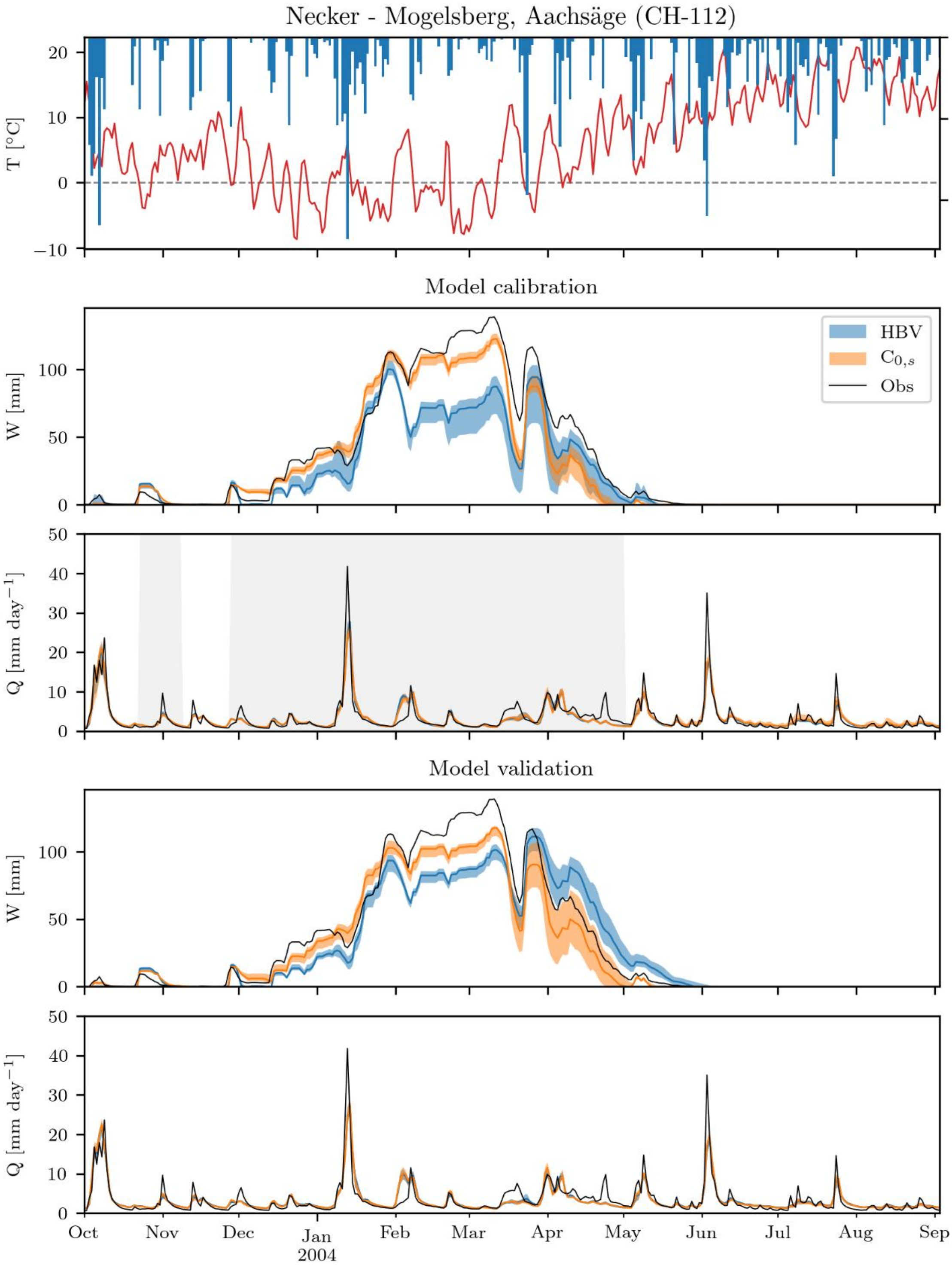

Necker - Mogelsberg, Aachsäge (CH-112)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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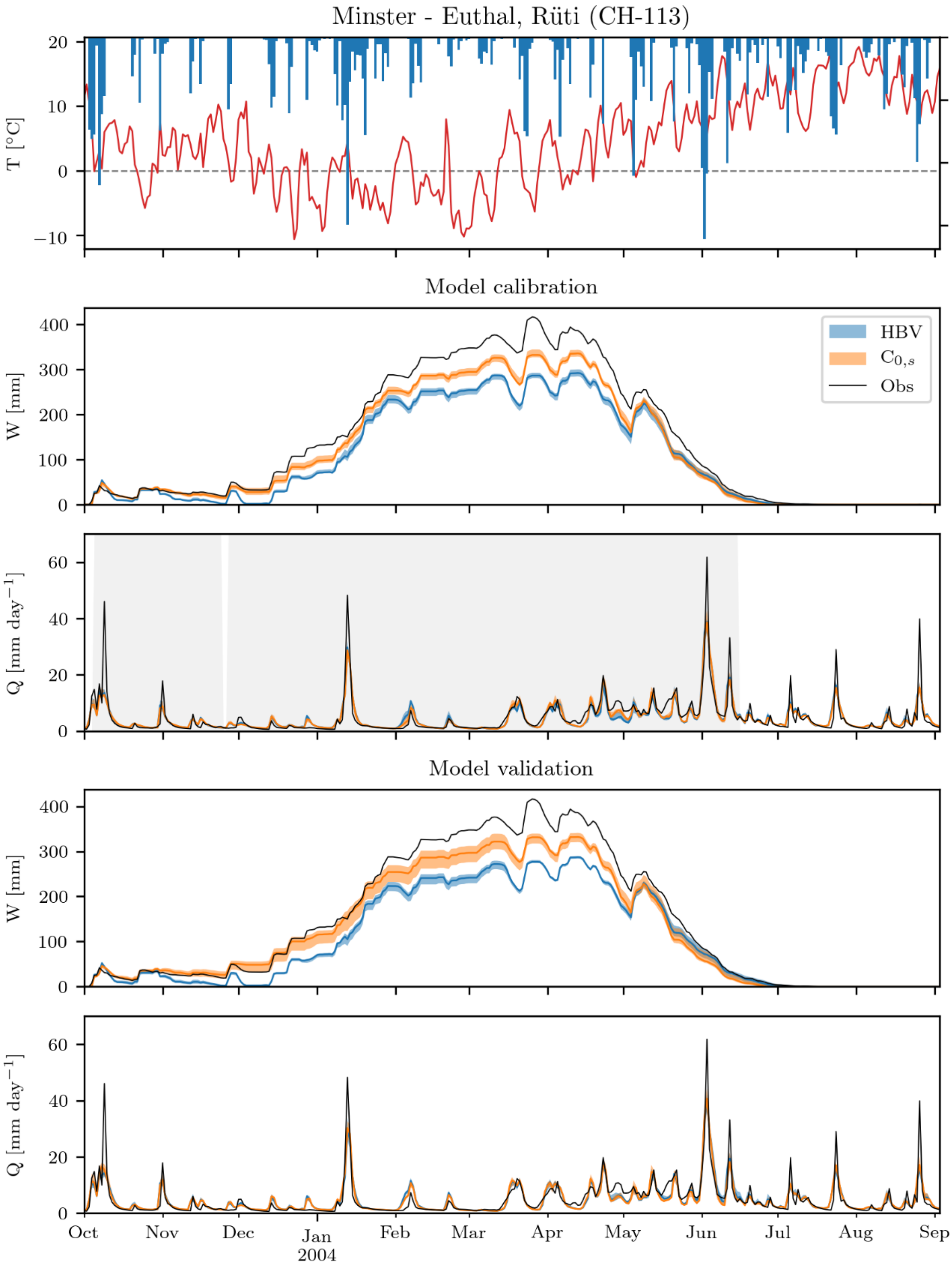

Minster - Euthal, Rüti (CH-113)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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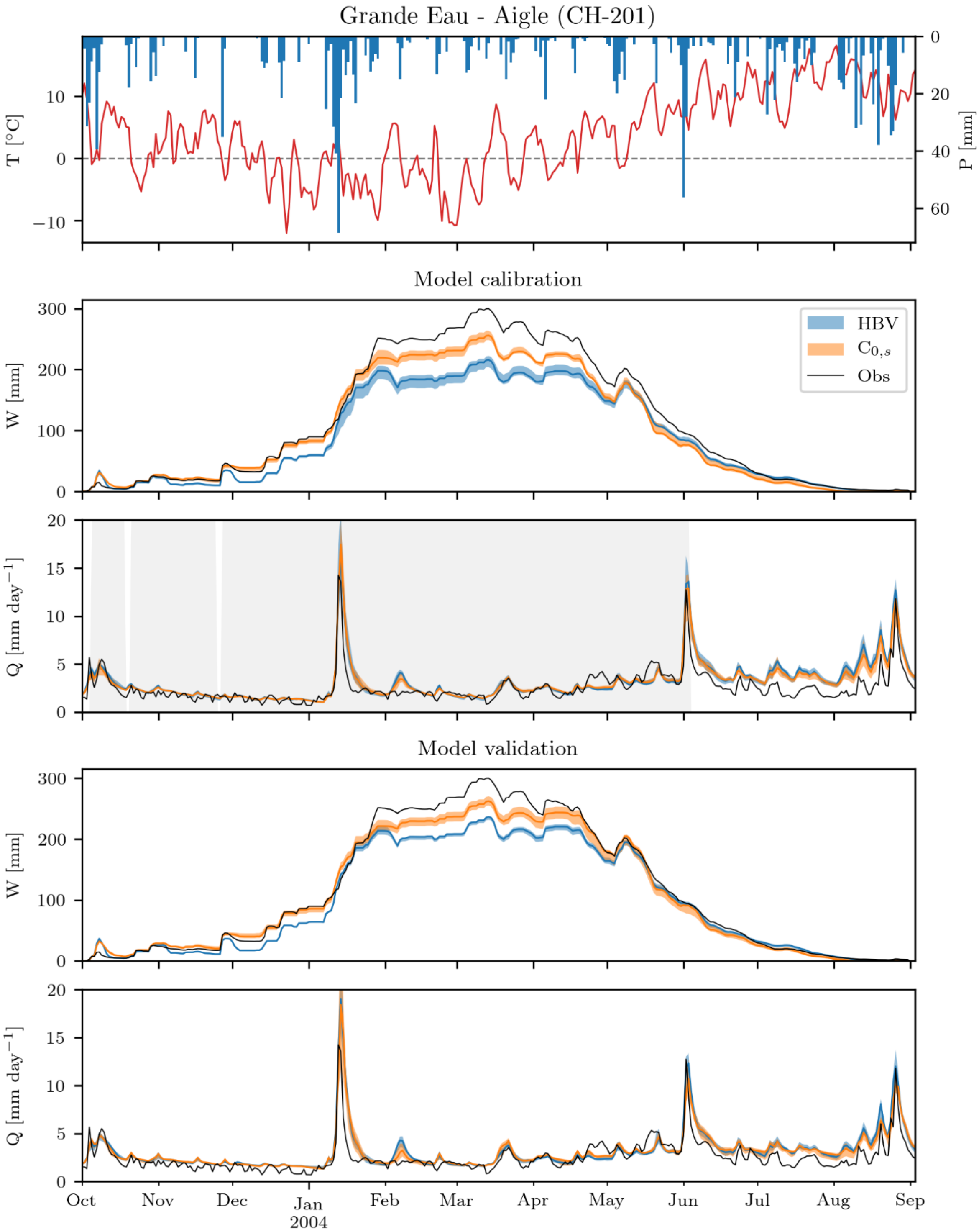

Grande Eau - Aigle (CH-201)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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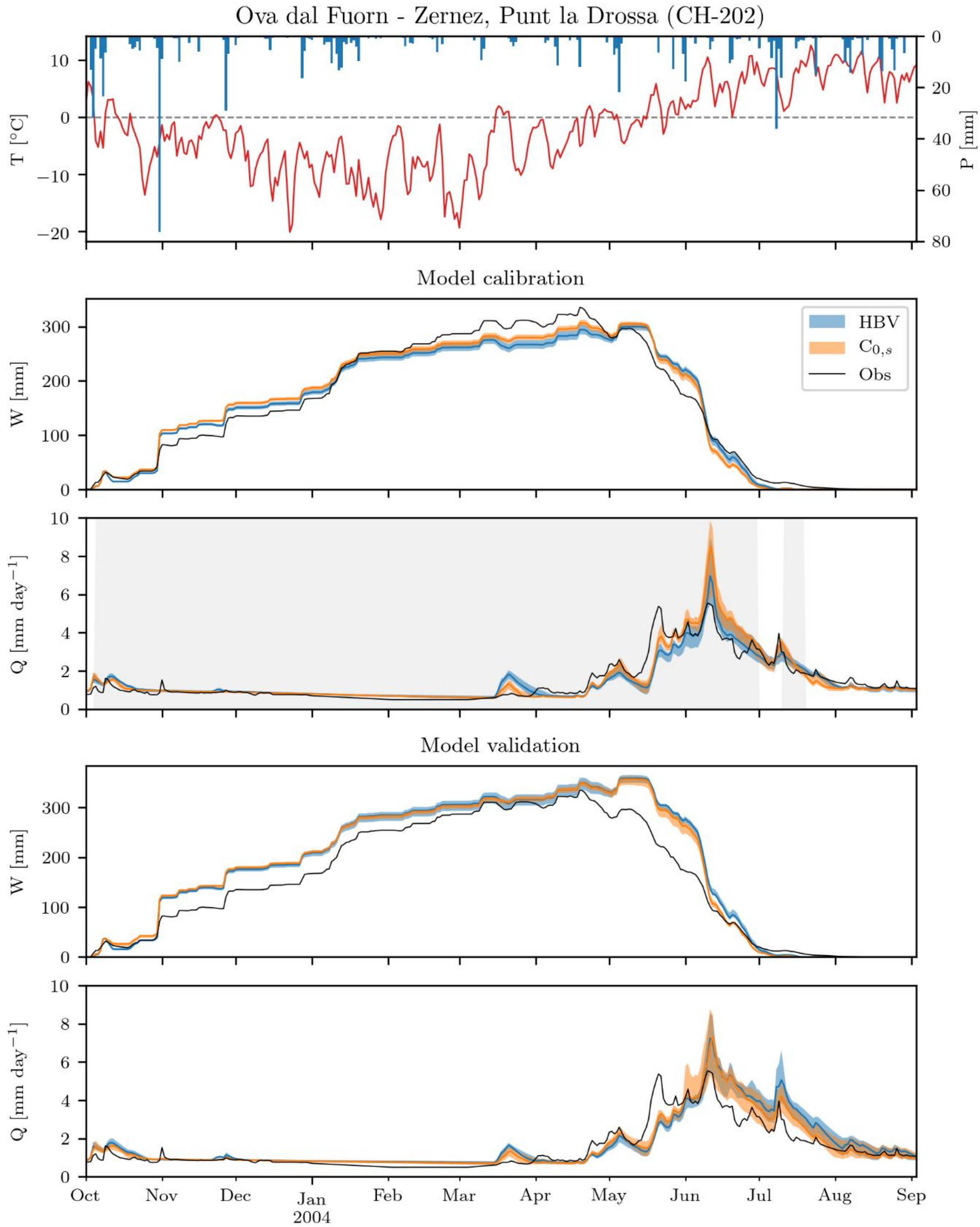

Ova dal Fuorn - Zernez, Punt la Drossa (CH-202)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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Q [mm day^{-1}]
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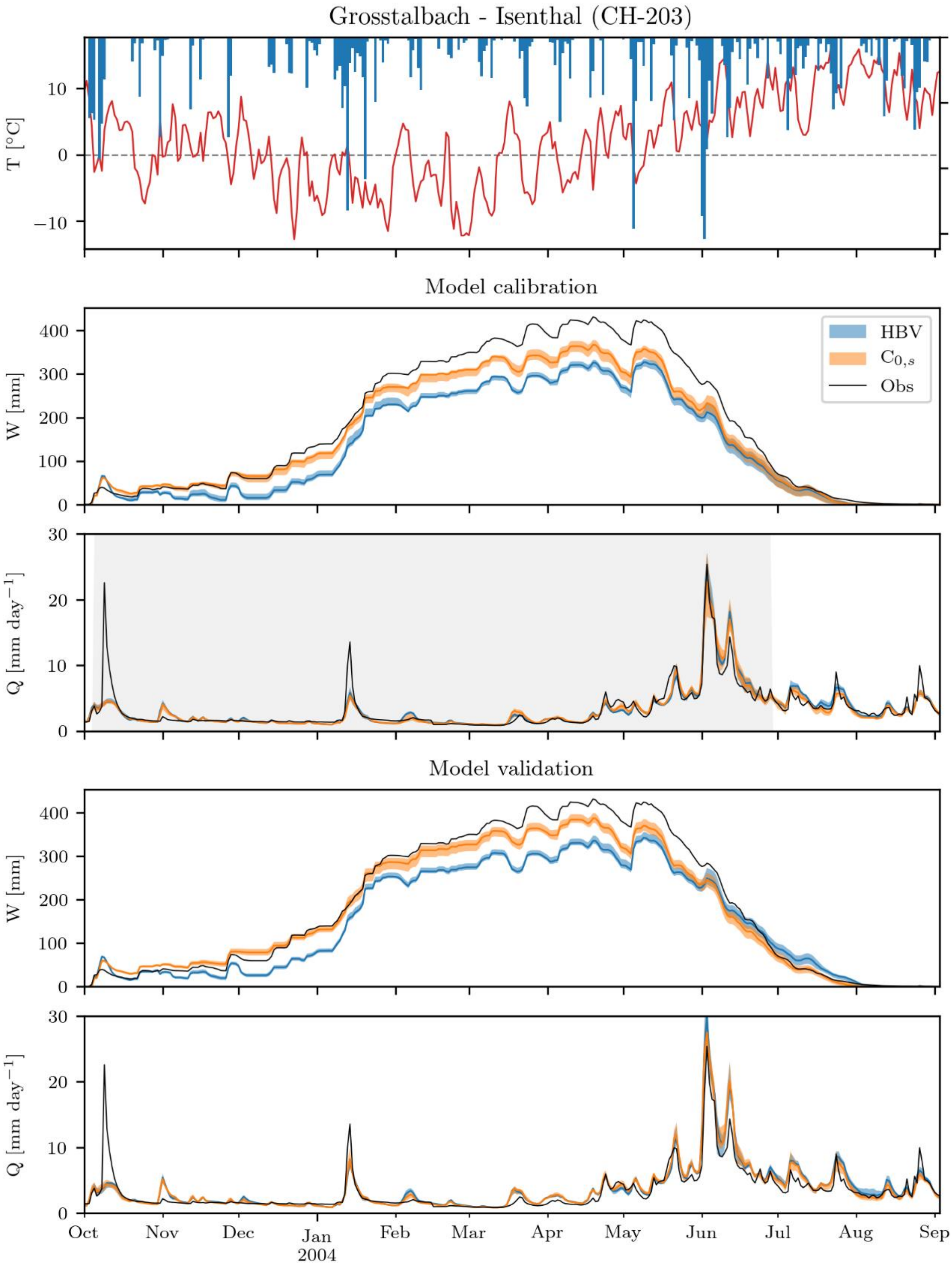

Grosstalbach - Isenthal (CH-203)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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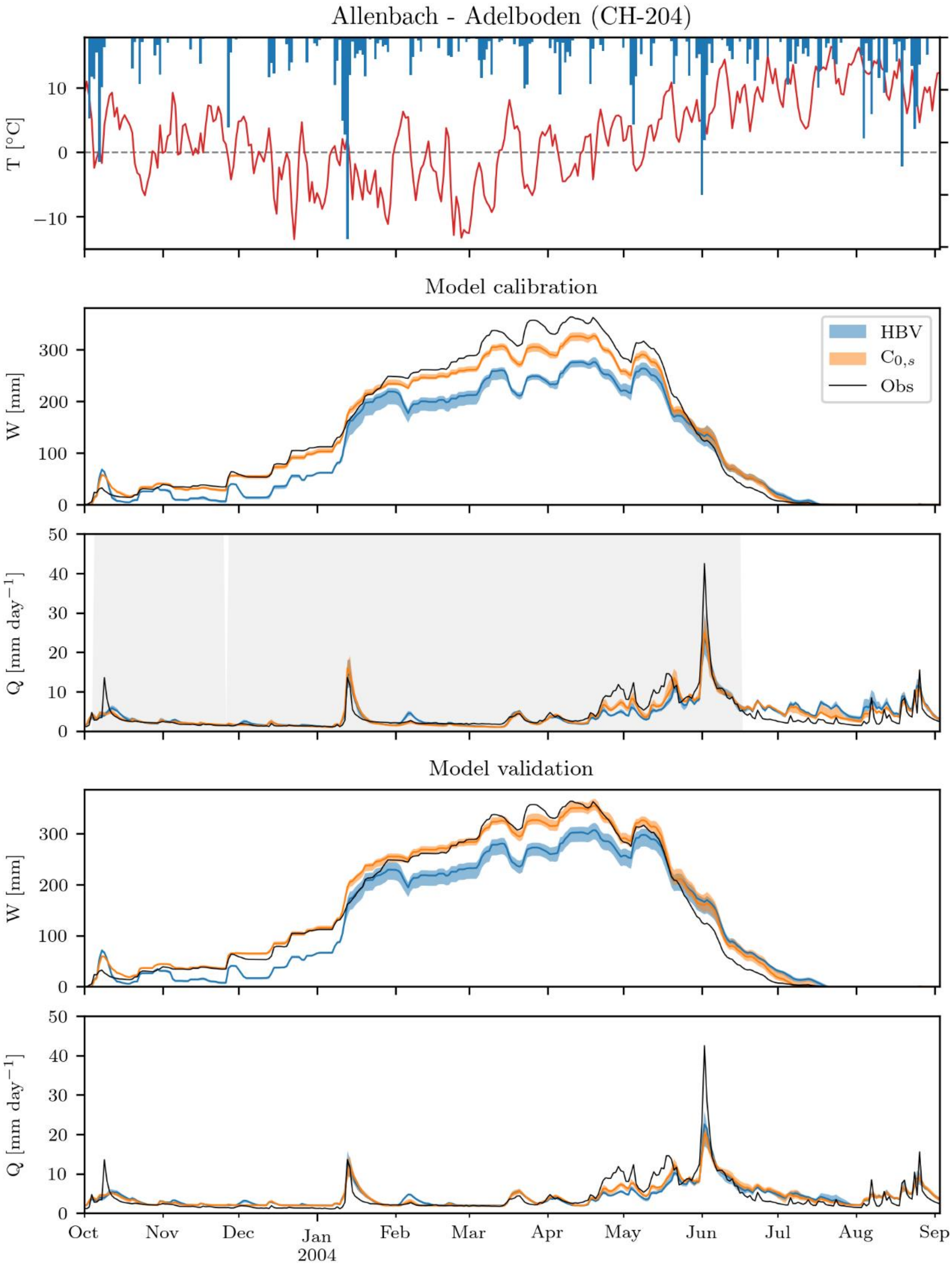
Allenbach - Adelboden (CH-204)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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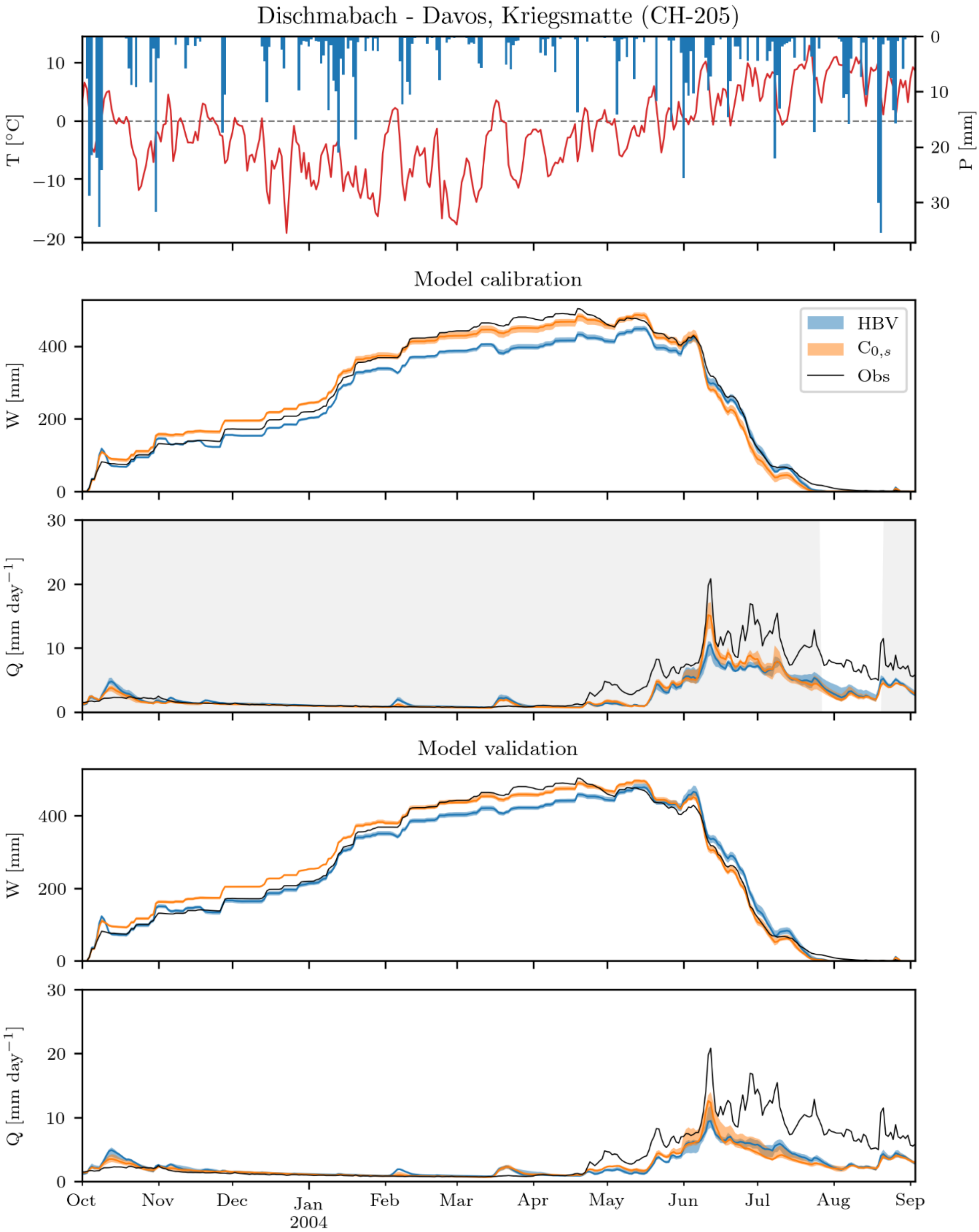

Dischmabach - Davos, Kriegsmatte (CH-205)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
C0,s
Obs
Q [mm day−1]
Model validation
W [mm]
Q [mm day−1]
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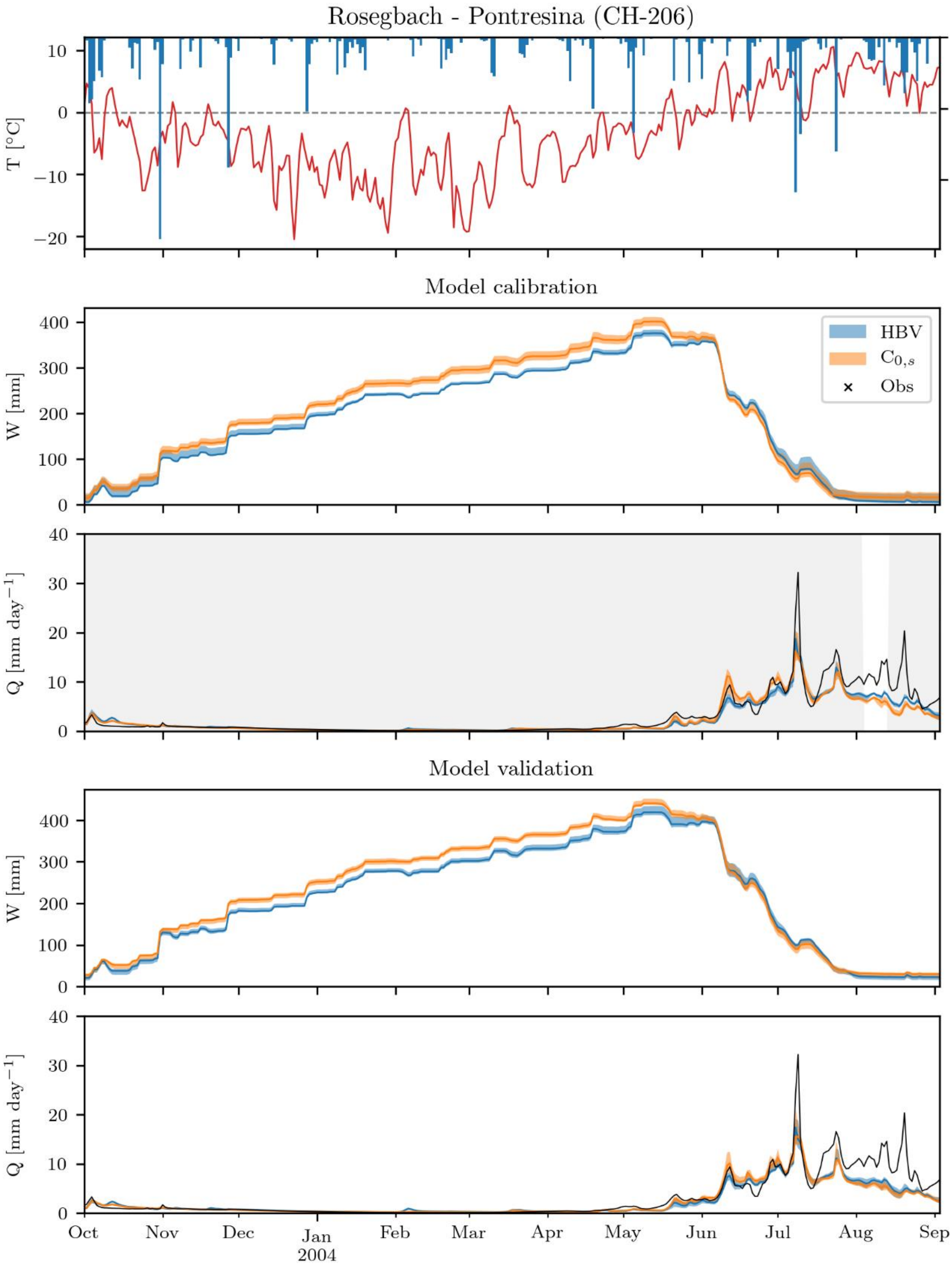

Rosegbach - Pontresina (CH-206)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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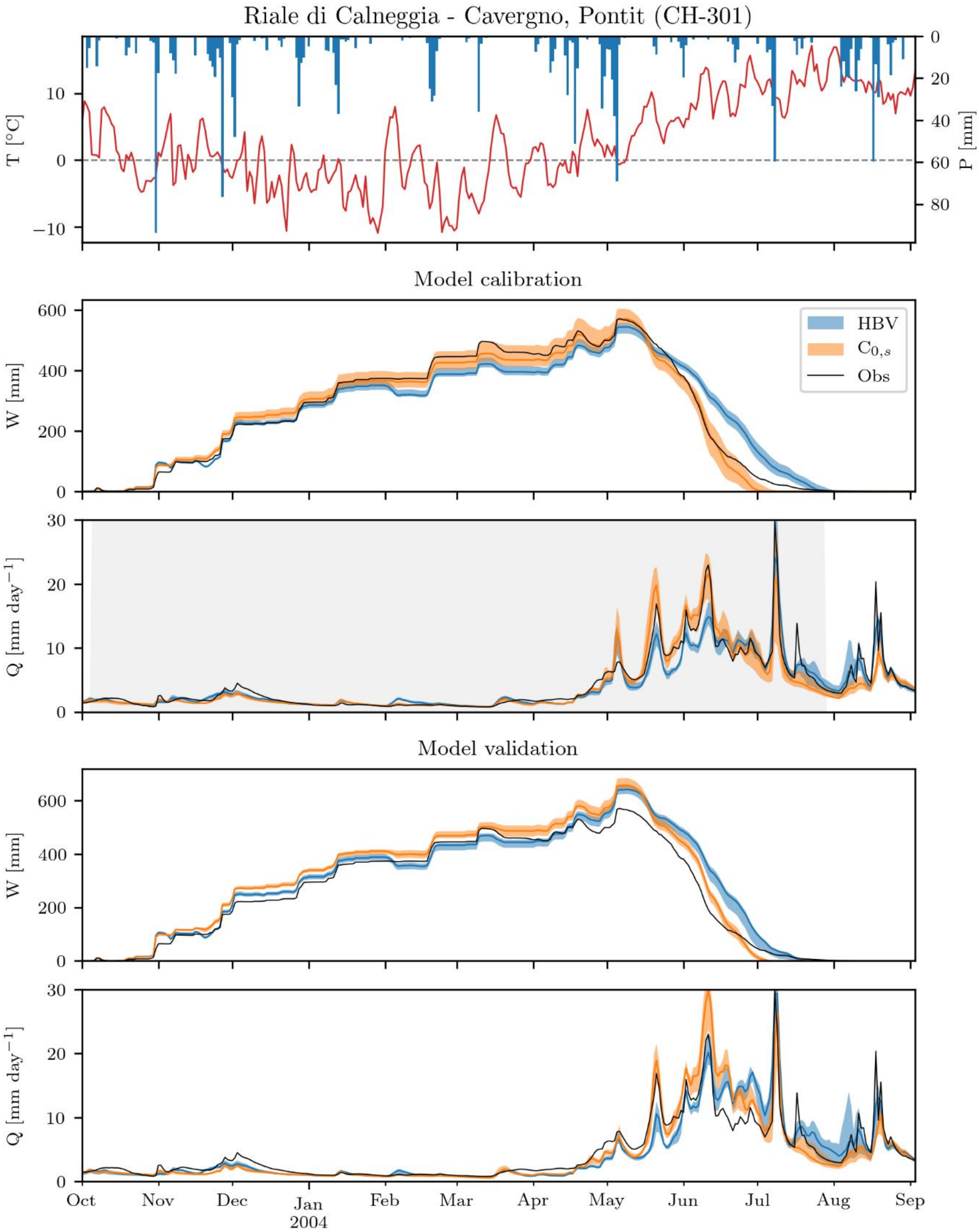

Riale di Calneggia - Cavergno, Pontit (CH-301)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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Q [mm day^{-1}]
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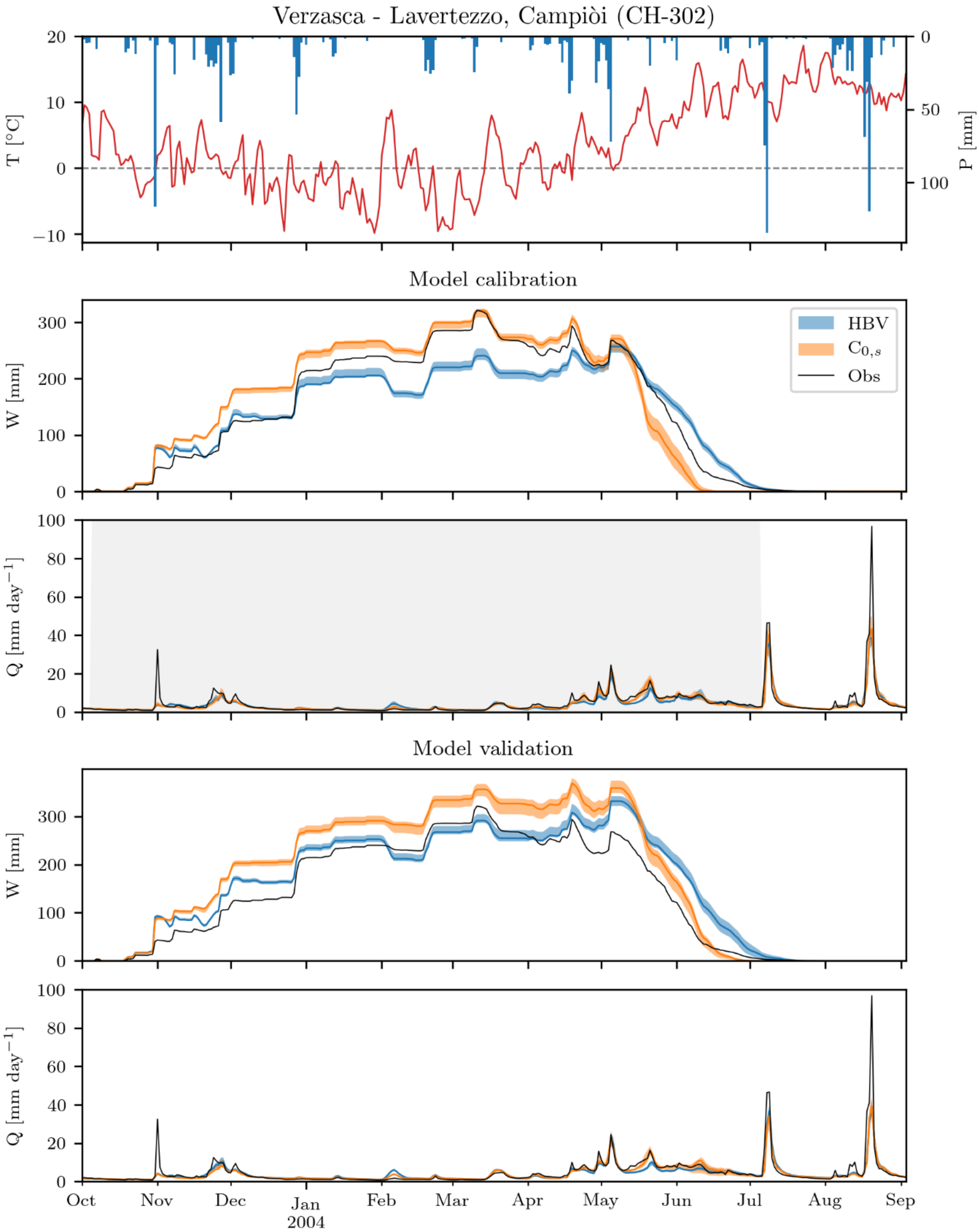

Verzasca - Lavertezzo, Campiòi (CH-302)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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Q [mm day^{-1}]
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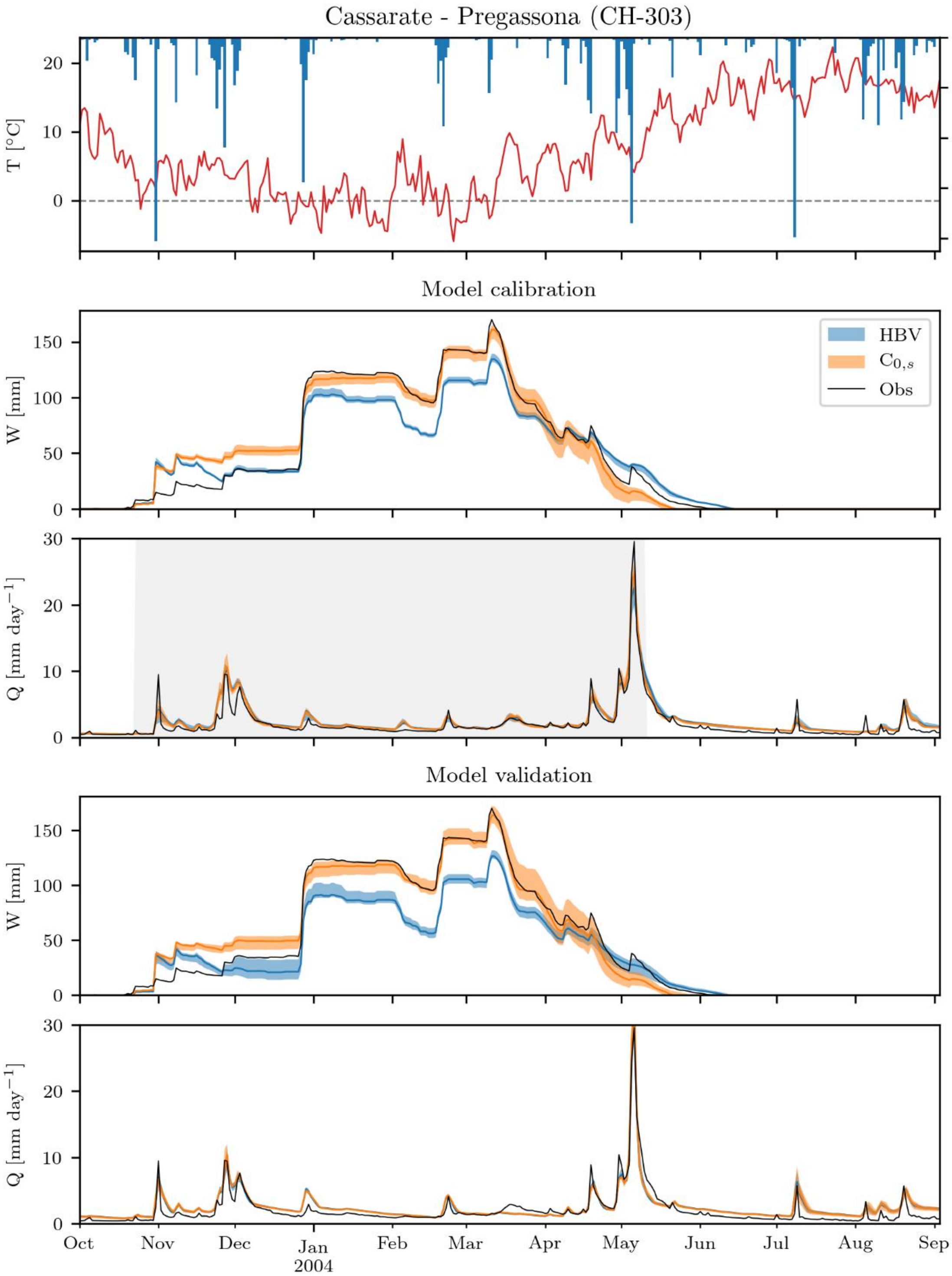

Cassarate - Pregassona (CH-303)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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Q [mm day^{-1}]
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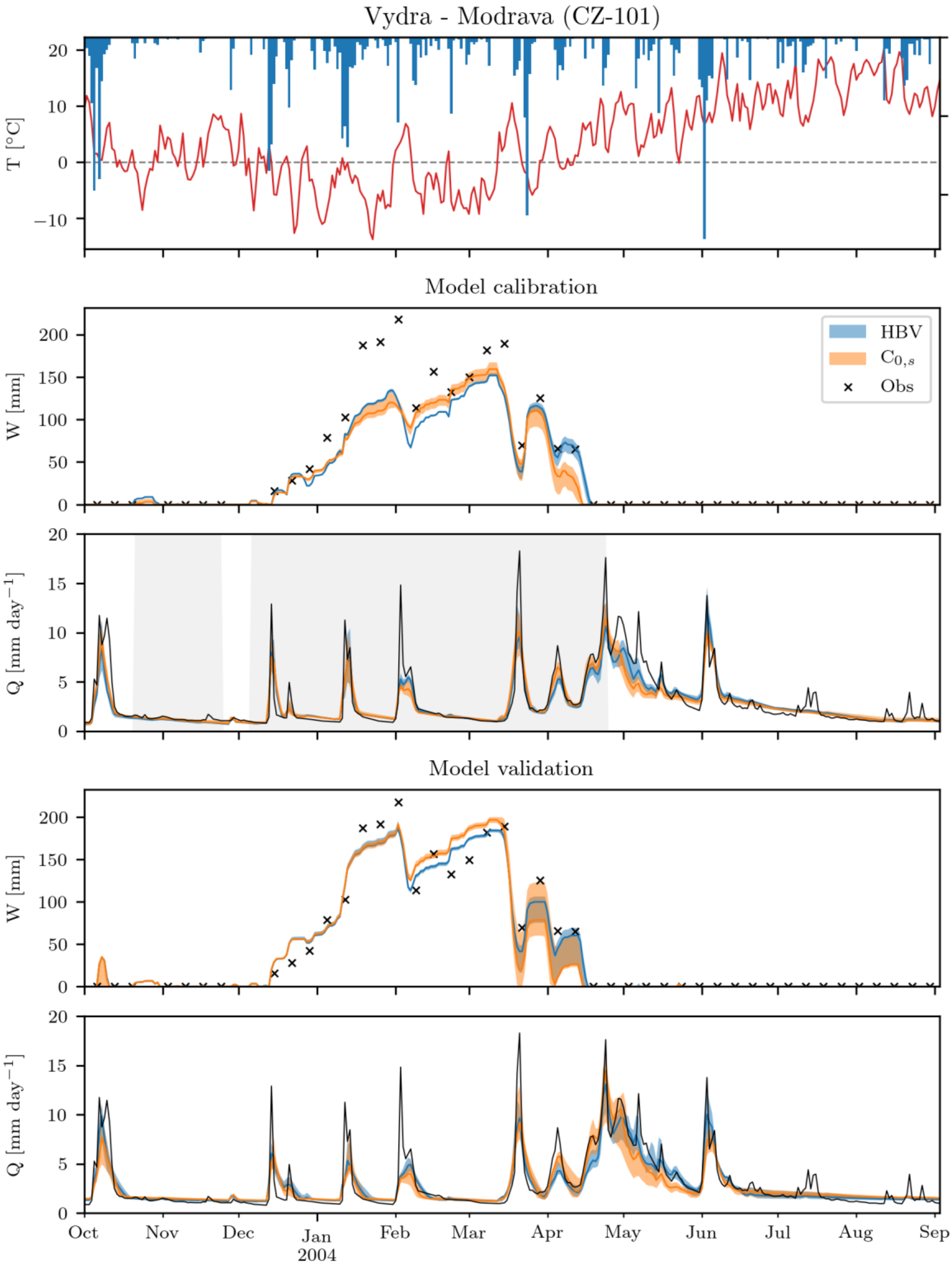
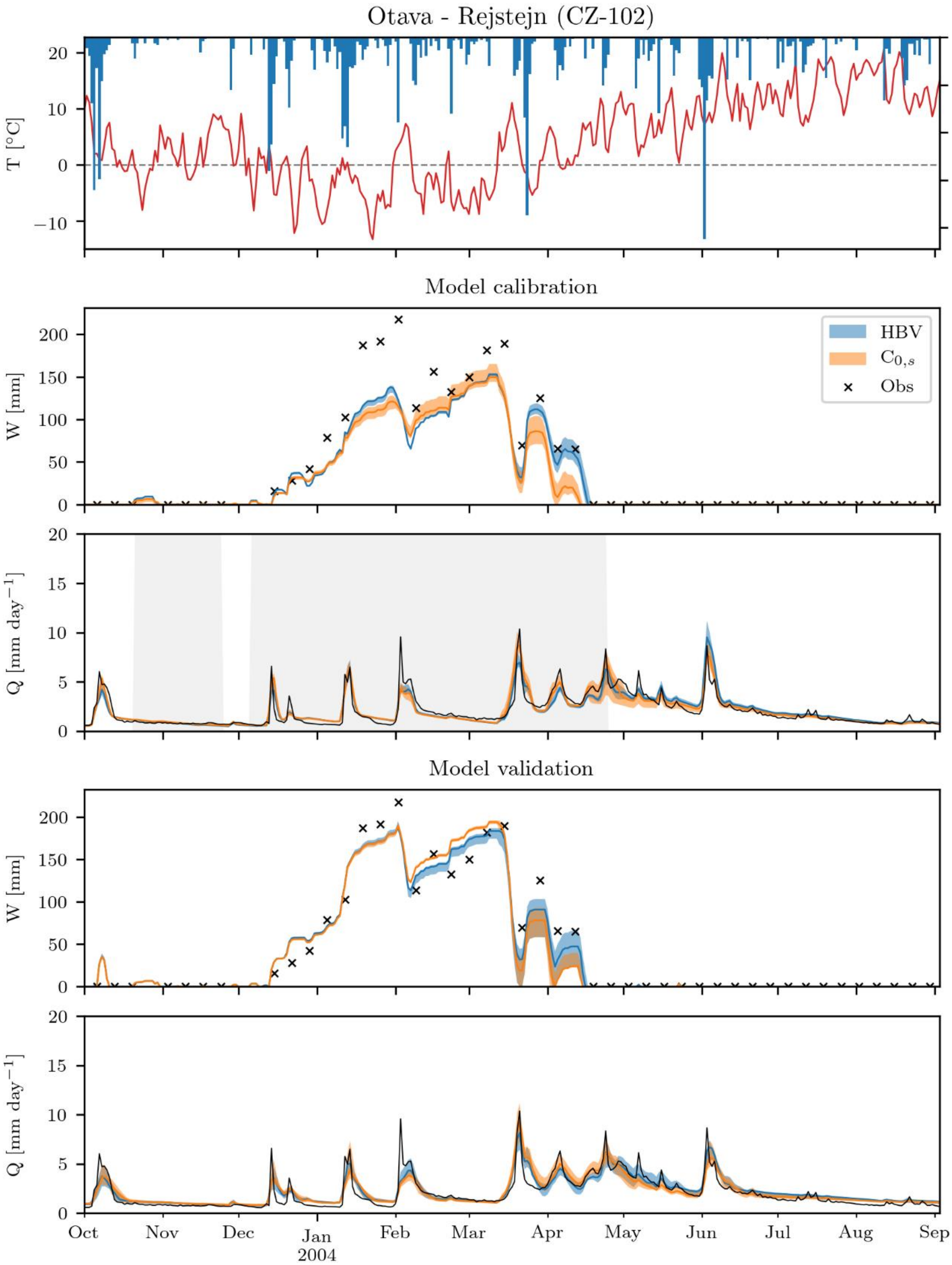


Figure S23 Time series (October 2003 – September 2004) for the Vydra catchment at Modrava (CZ-101). Top: daily mean air temperature and total precipitation. Middle: model calibration results. Bottom: model validation results. The model calibration and validation are further subdivided into (top) snow water equivalent station measured values (black crosses) and corresponding simulated values at the same elevation (HBV in blue and the model structure modification including a seasonally-varying degree-day factor, $C_{0,s}$ in orange), and (bottom) observed (grey line) and simulated stream runoff (HBV in blue and the model structure modification including a seasonal degree-day factor in orange). The grey field represents the period used when calibrating the model against the logarithmic stream runoff. The uncertainty fields for model simulation cover the 10th – 90th percentiles range while the solid line represents the median value.



Otava - Rejstejn (CZ-102)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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Q [mm day^{-1}]
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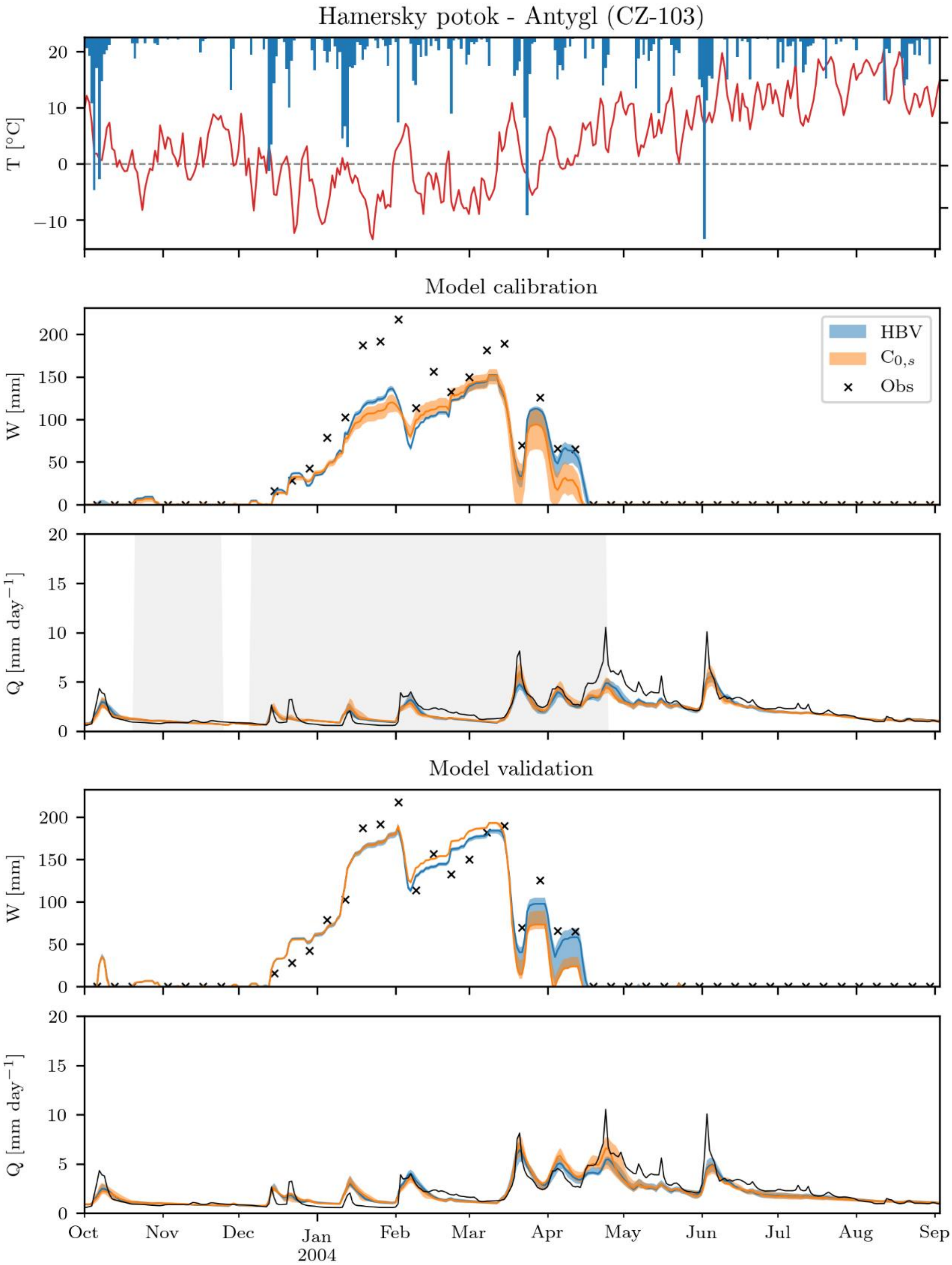

Hamersky potok - Antygl (CZ-103)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
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Q [mm day^{-1}]
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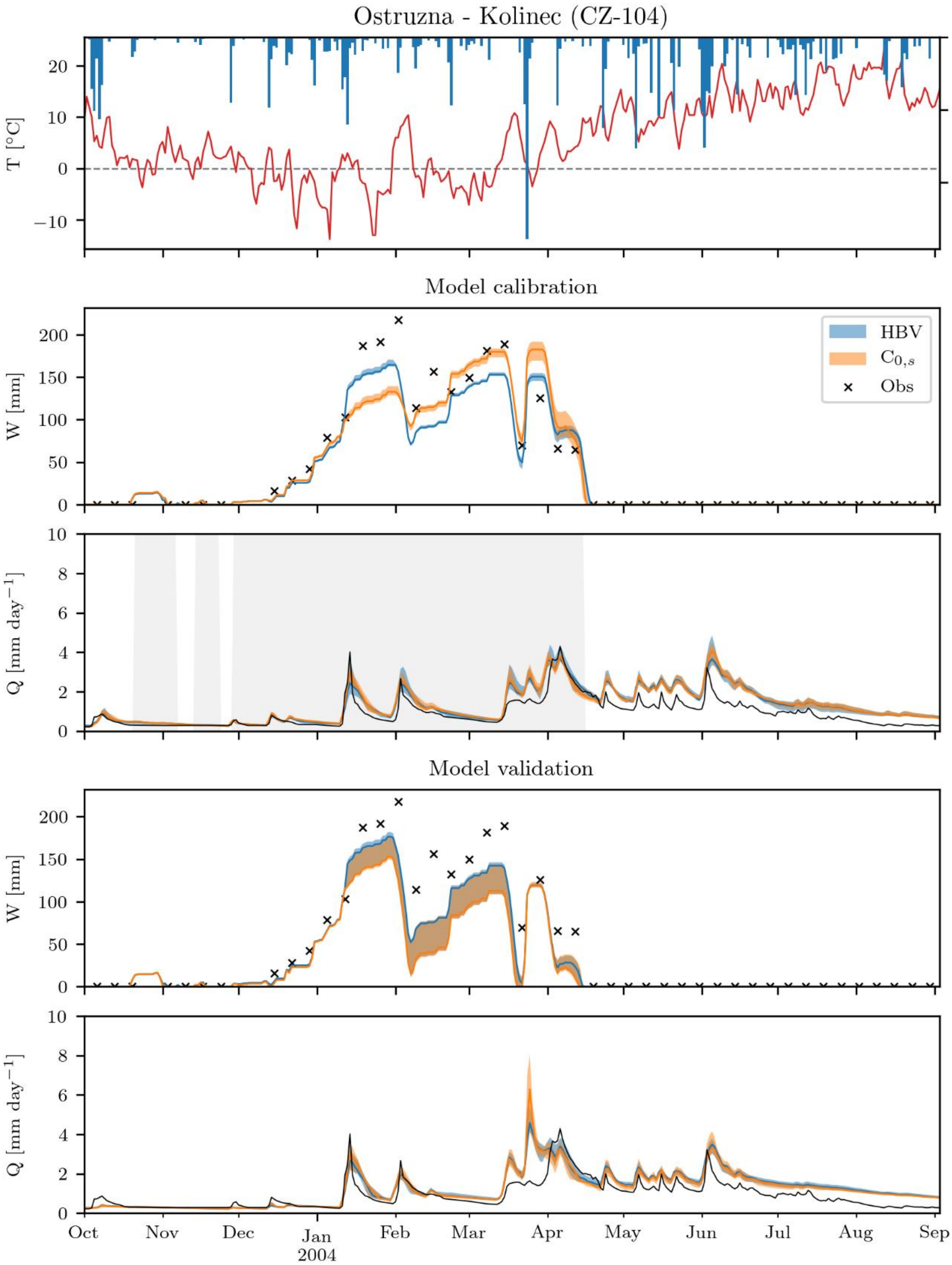

Ostruzna - Kolinec (CZ-104)
T [°C]
P [mm]
Model calibration
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Q [mm day−1]
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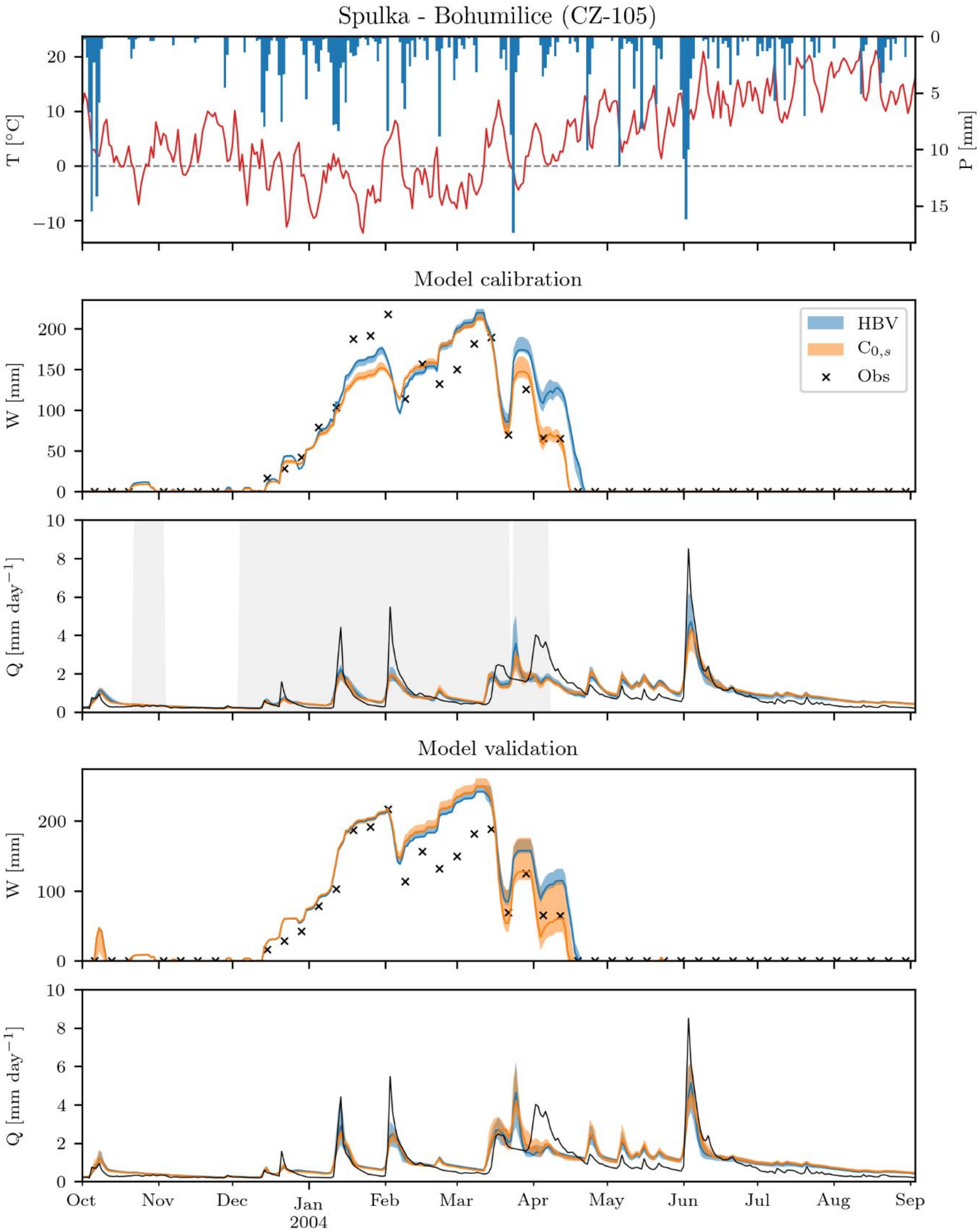

Spulka - Bohumilice (CZ-105)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
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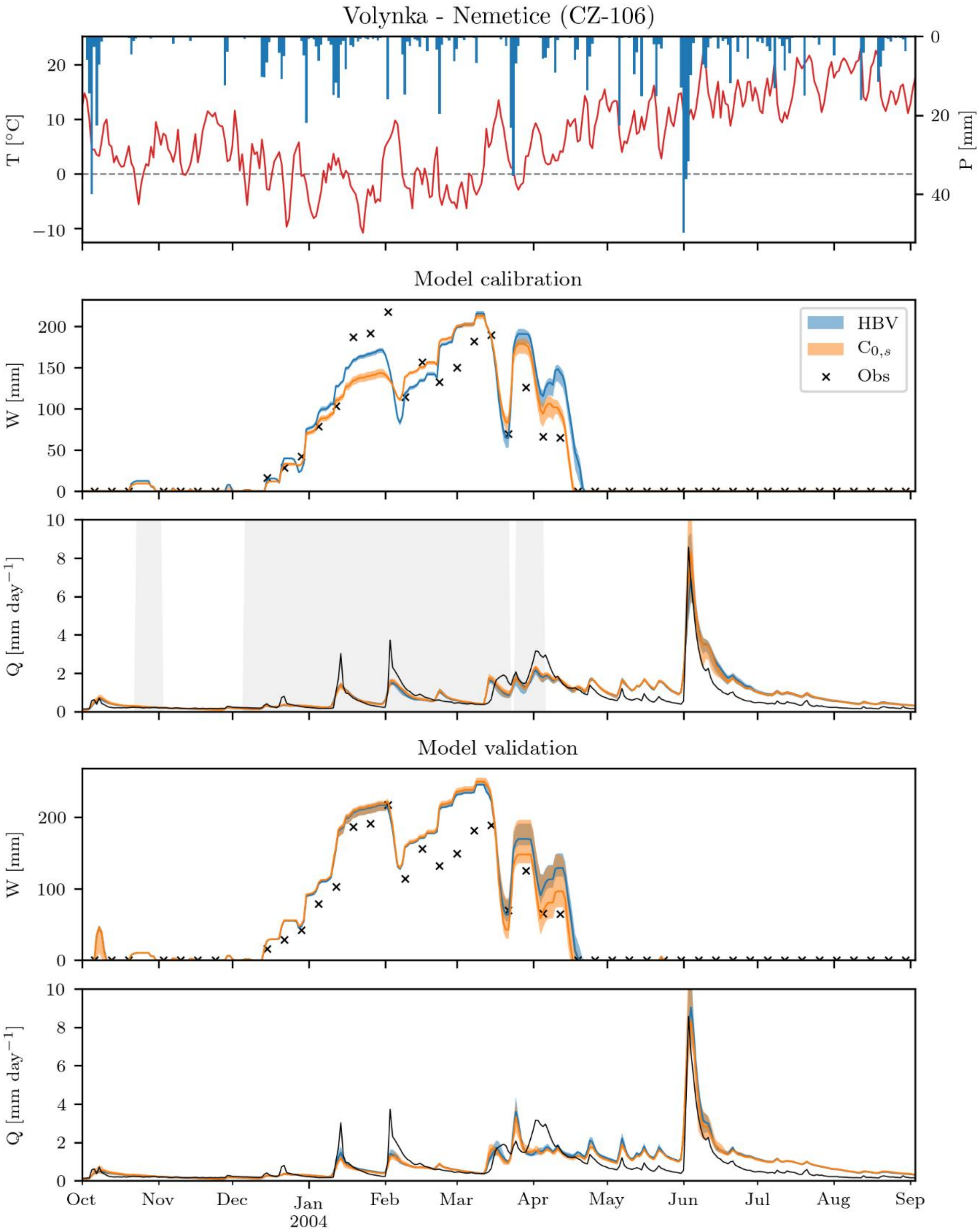

Volynka - Nemetice (CZ-106)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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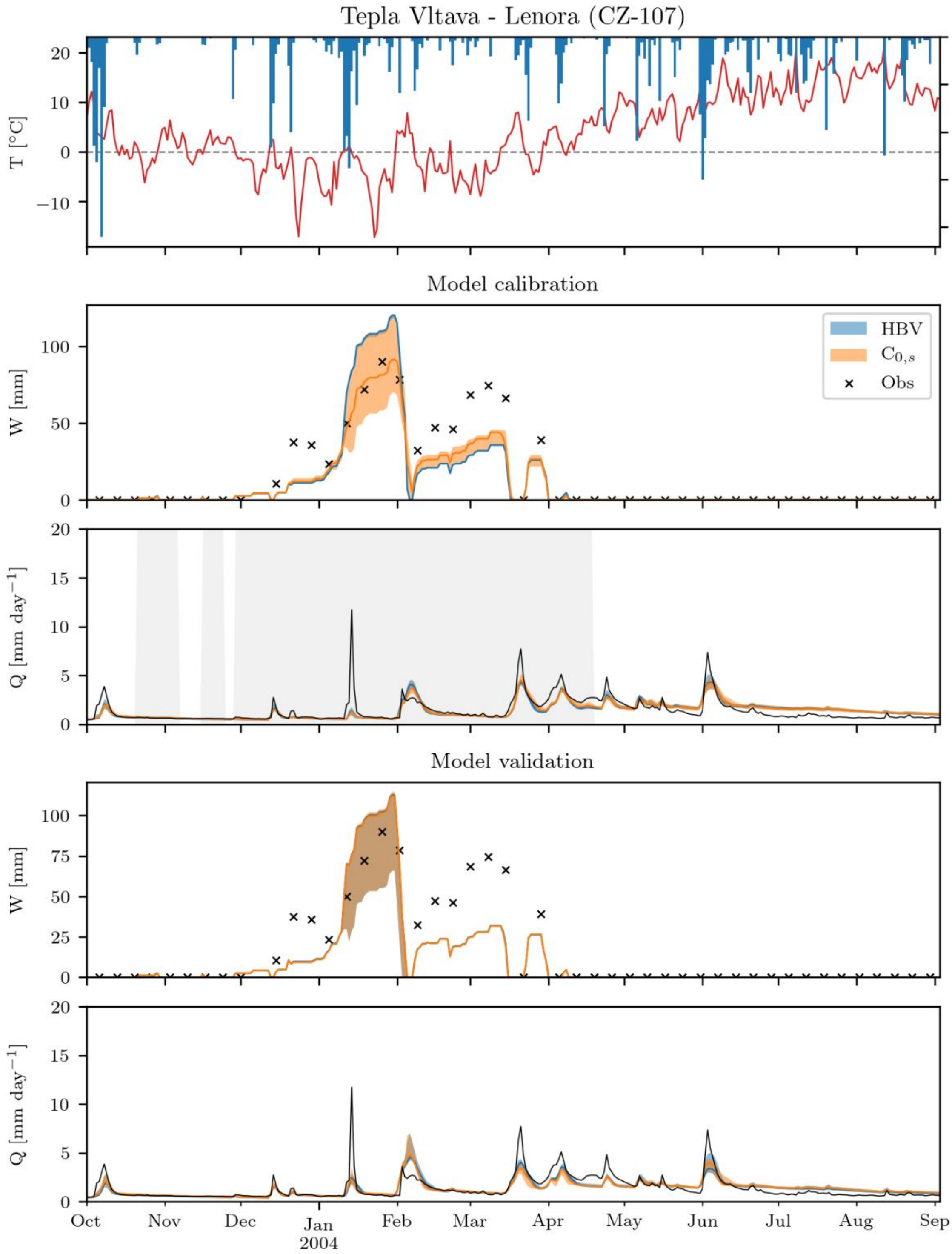

Tepla Vltava - Lenora (CZ-107)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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Q [mm day^{-1}]
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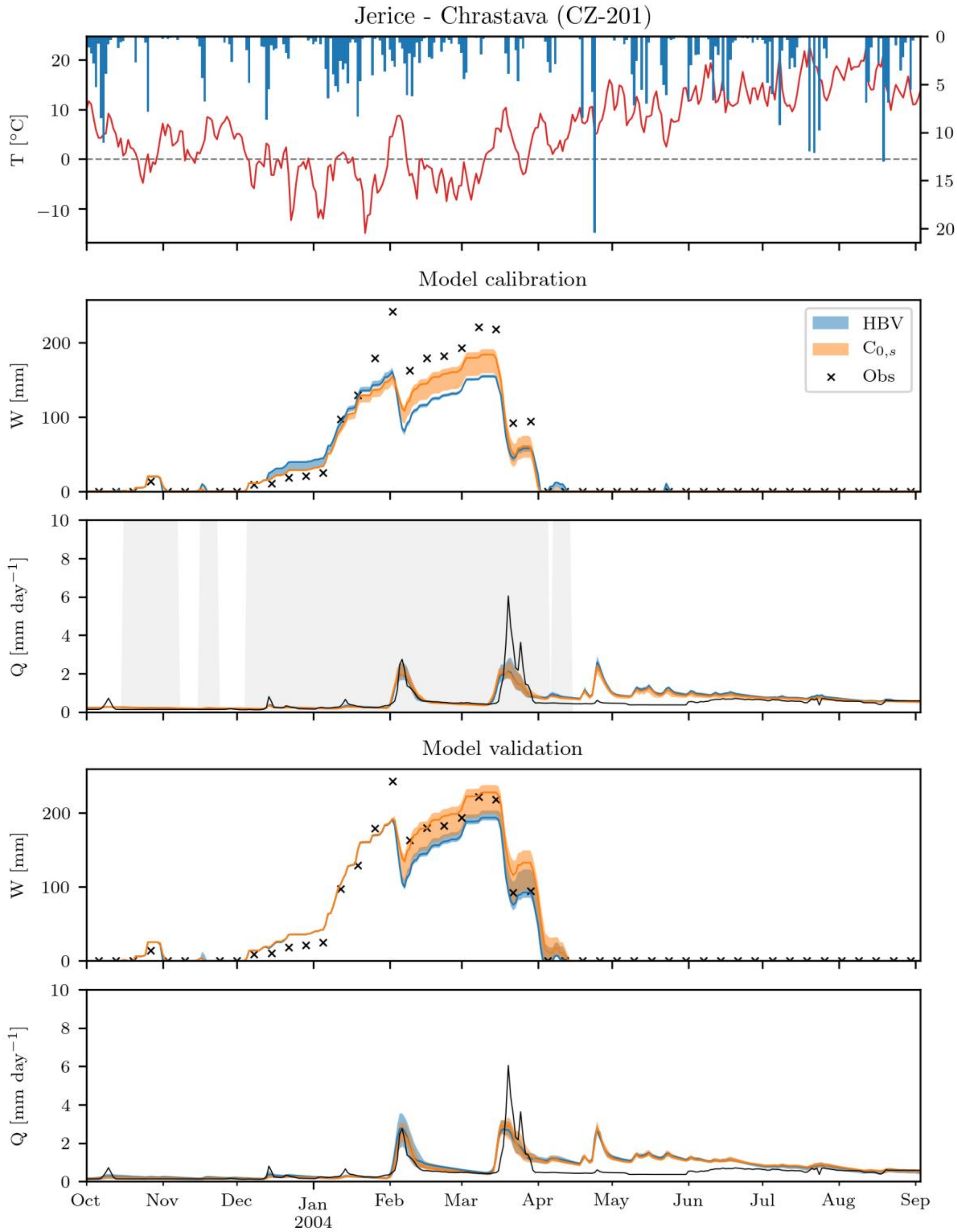

Jerice - Chrastava (CZ-201)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
C0,s
Obs
Q [mm day−1]
Model validation
W [mm]
Q [mm day−1]
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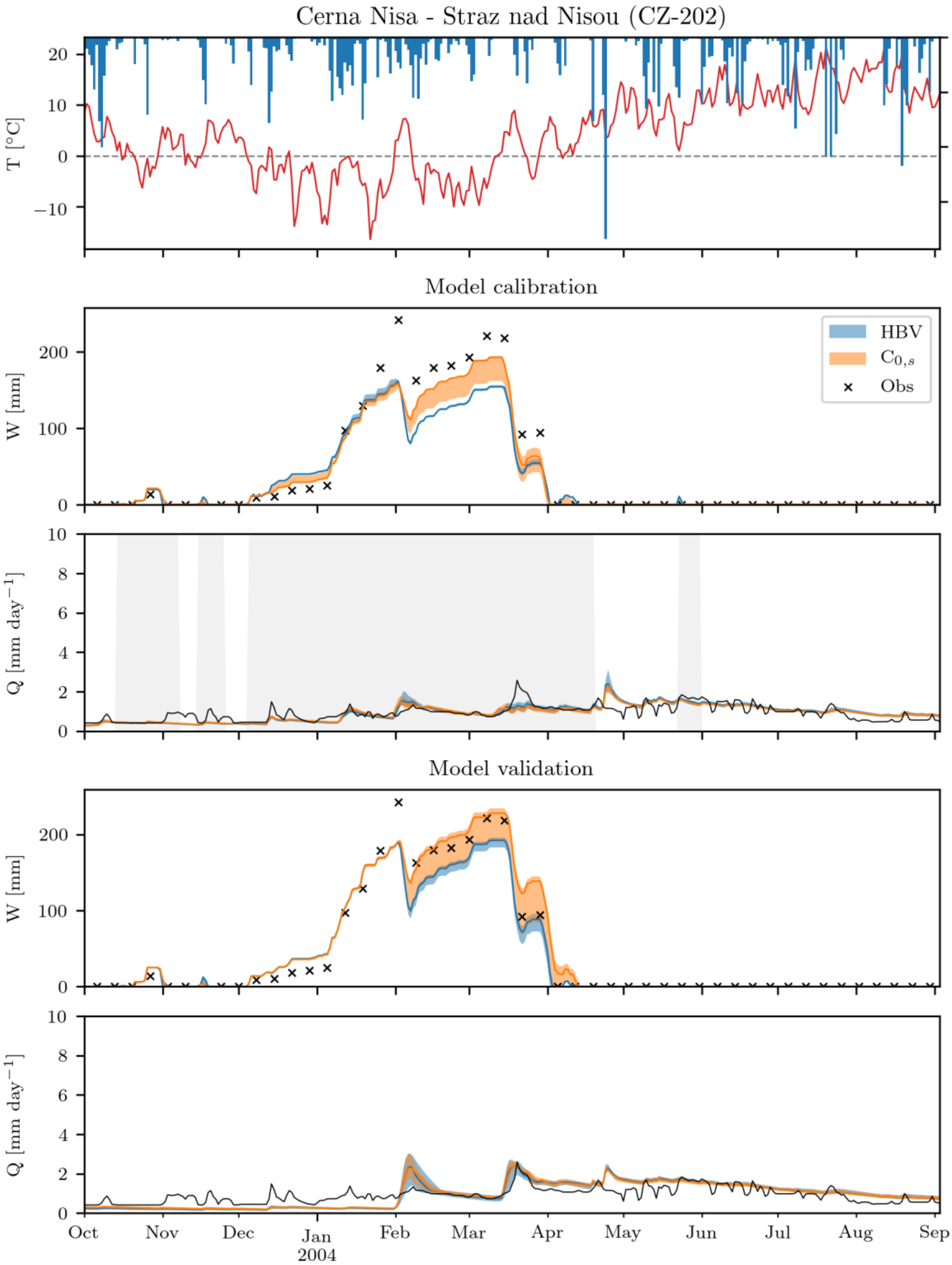

Cerna Nisa - Straz nad Nisou (CZ-202)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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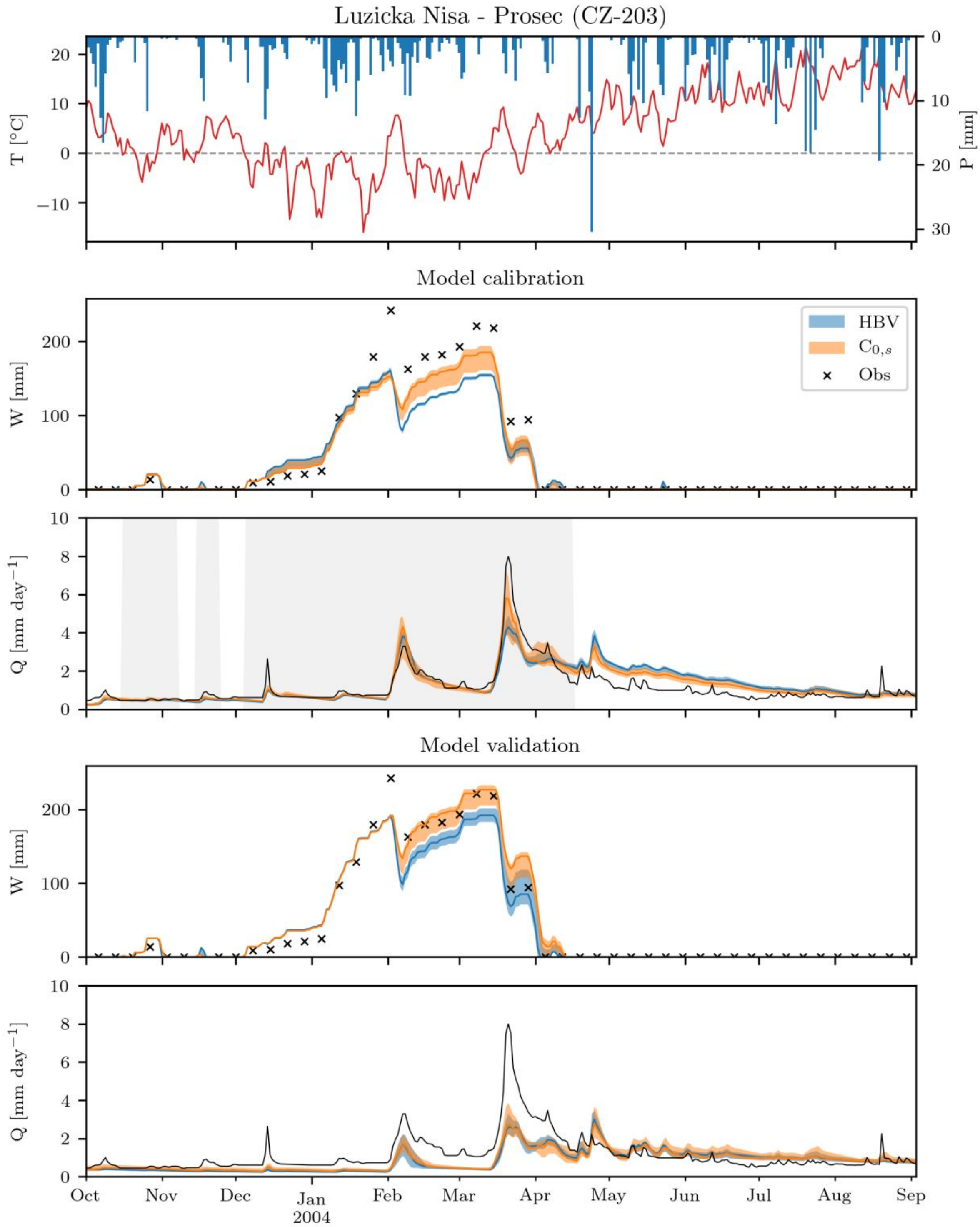

Luzicka Nisa - Prosec (CZ-203)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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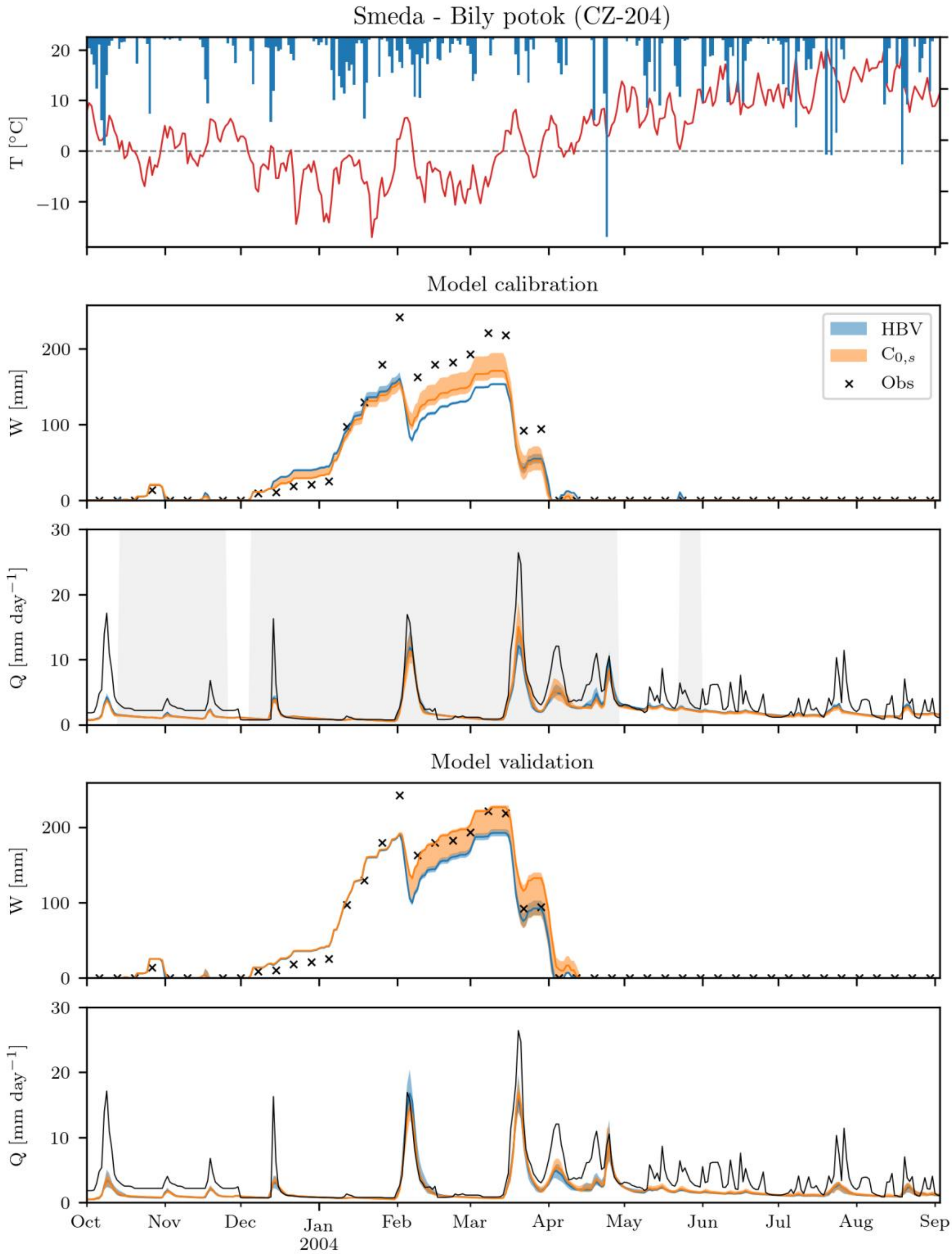

Smeda - Bily potok (CZ-204)
T [°C]
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Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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Q [mm day^{-1}]
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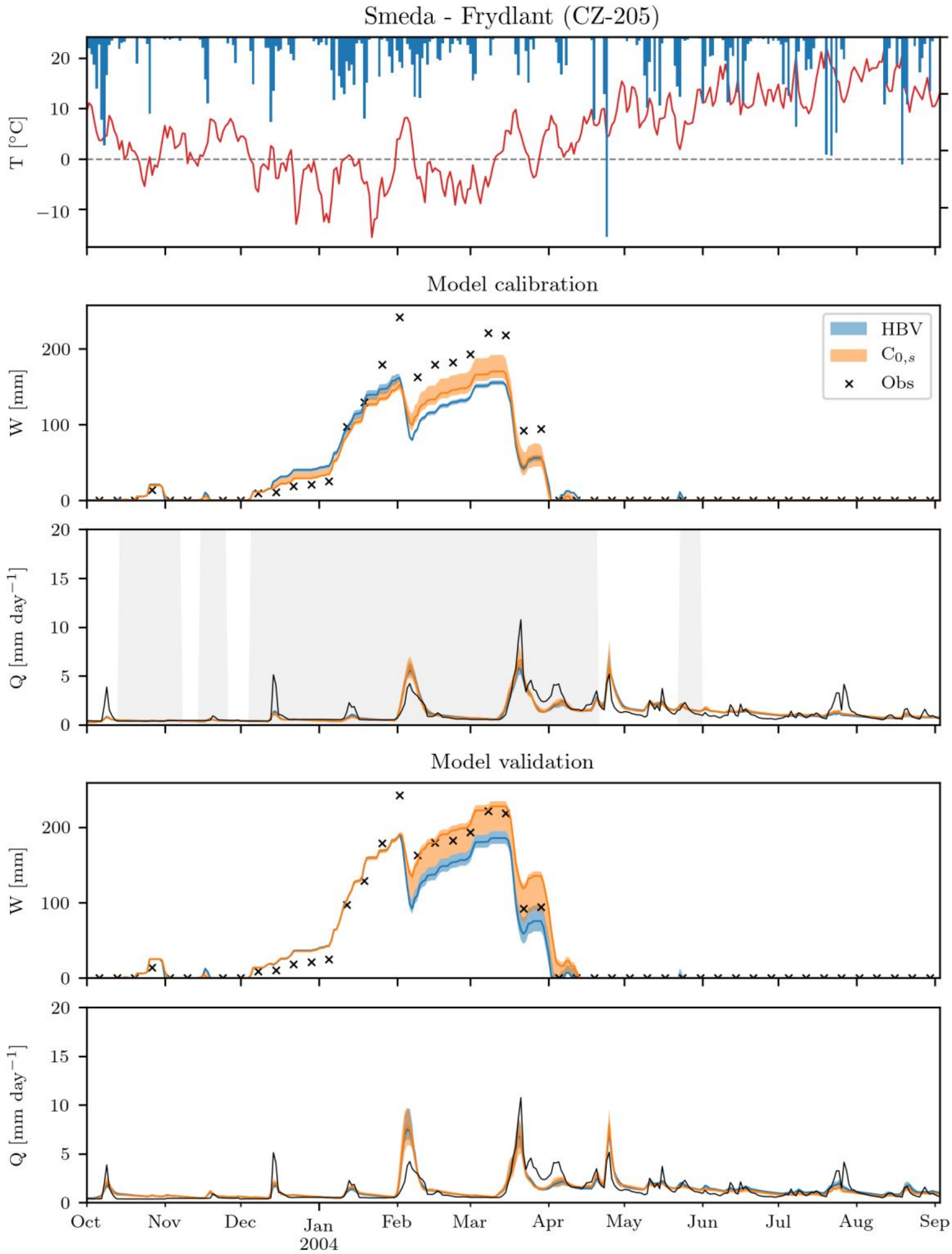
Smeda - Frydlant (CZ-205)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
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Q [mm day^{-1}]
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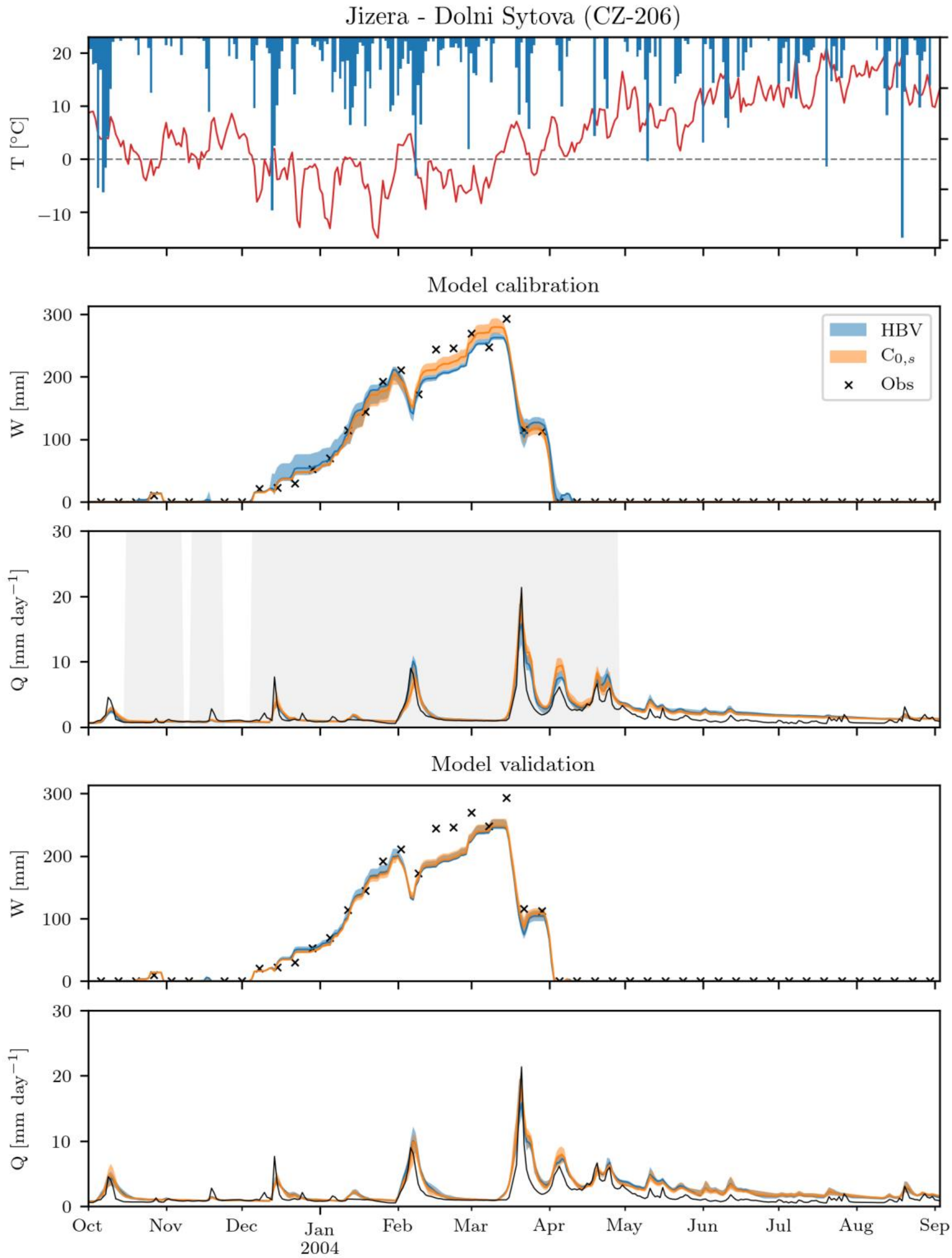

Jizera - Dolni Sytova (CZ-206)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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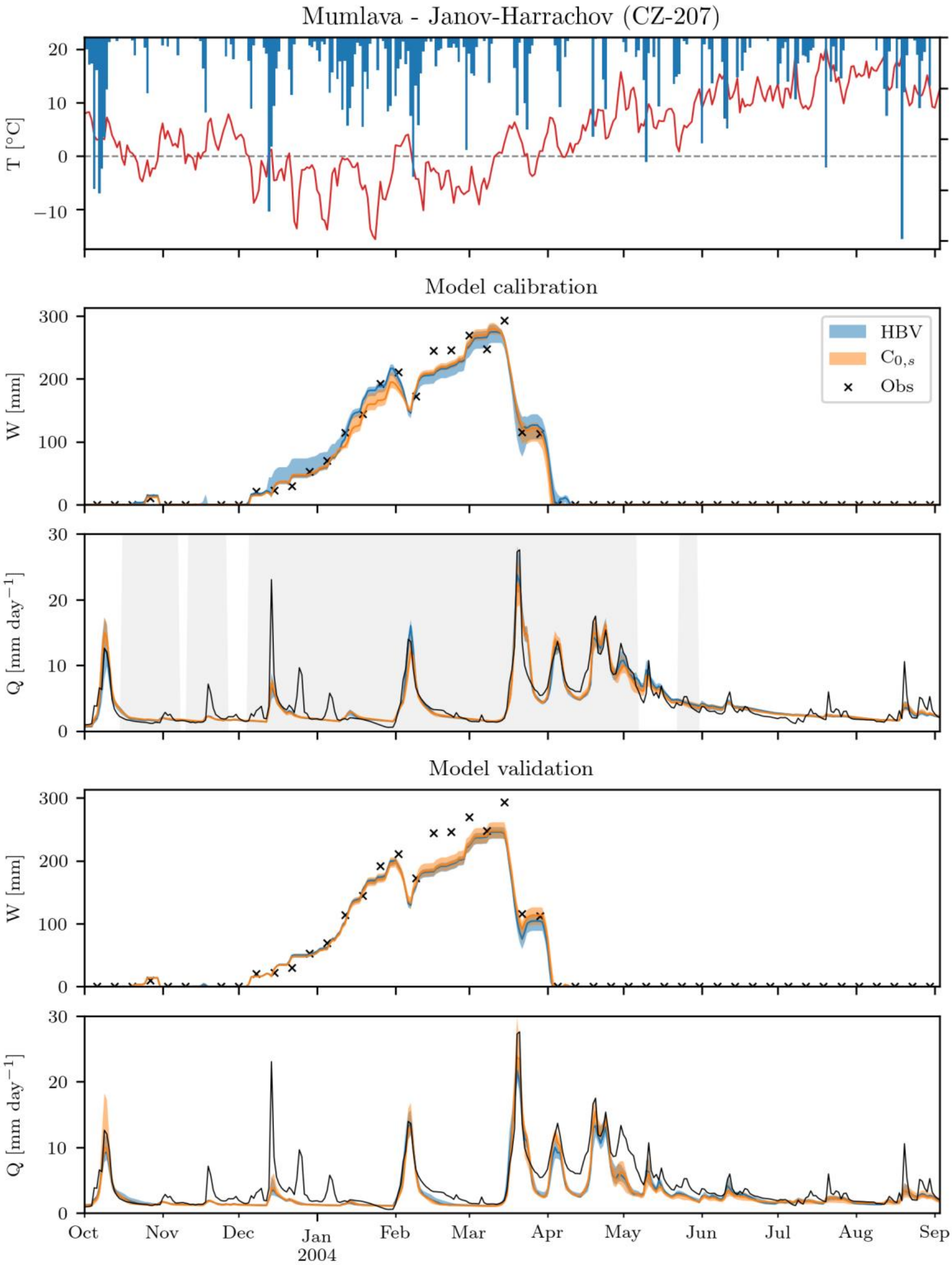

Mumlava - Janov-Harrachov (CZ-207)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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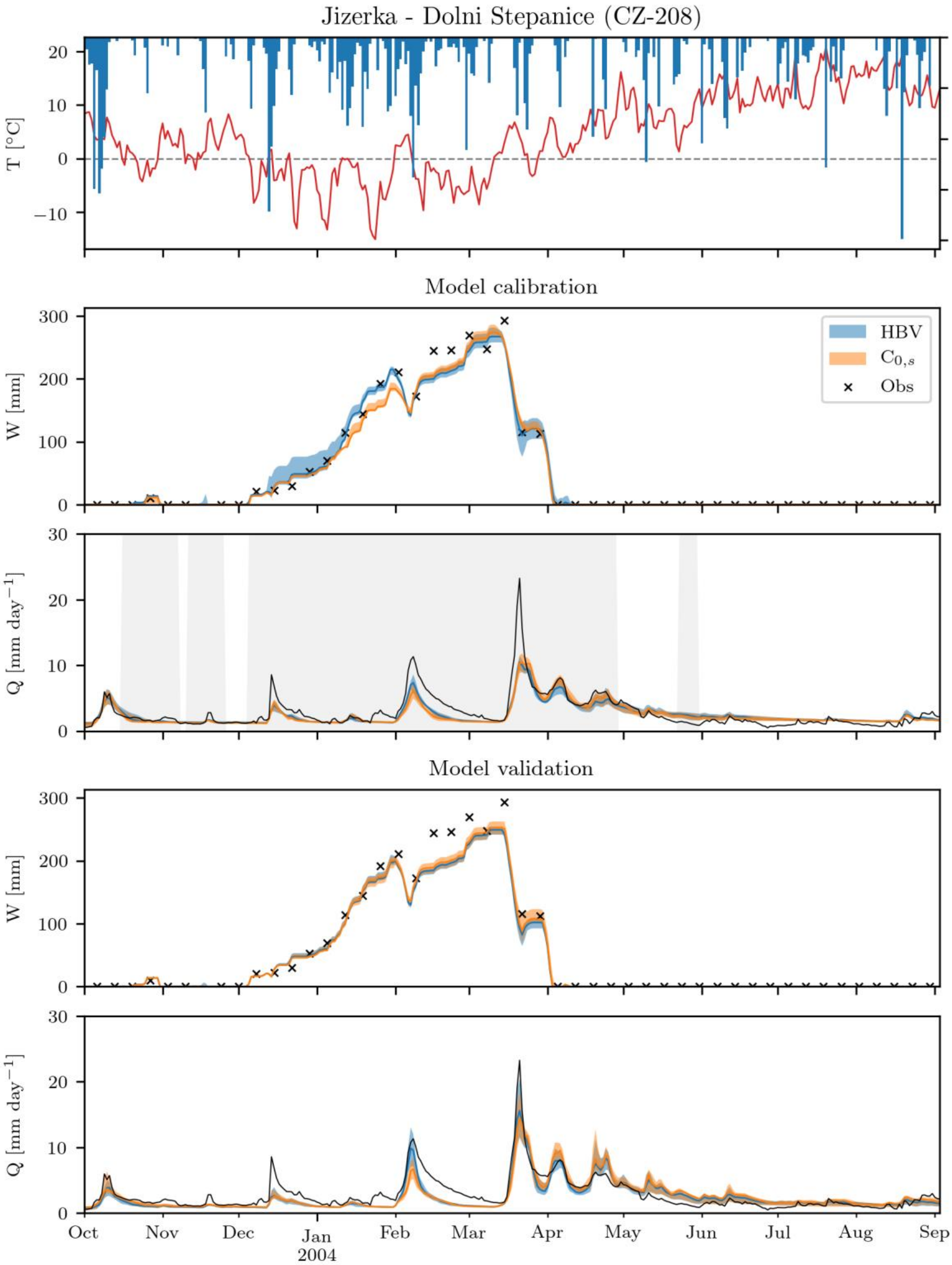

Jizerka - Dolni Stepanice (CZ-208)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
Oct
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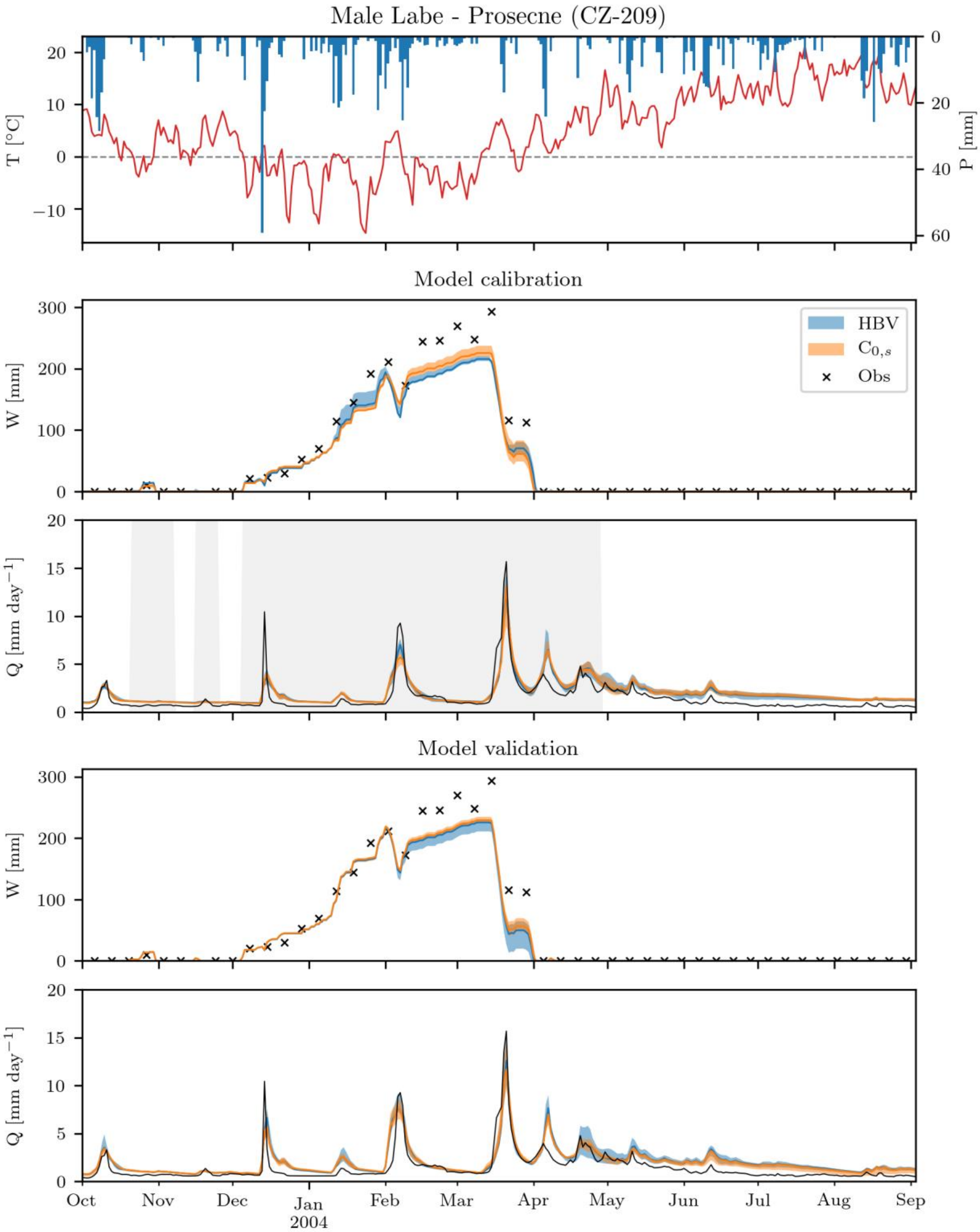

Male Labe - Prosecne (CZ-209)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
Oct
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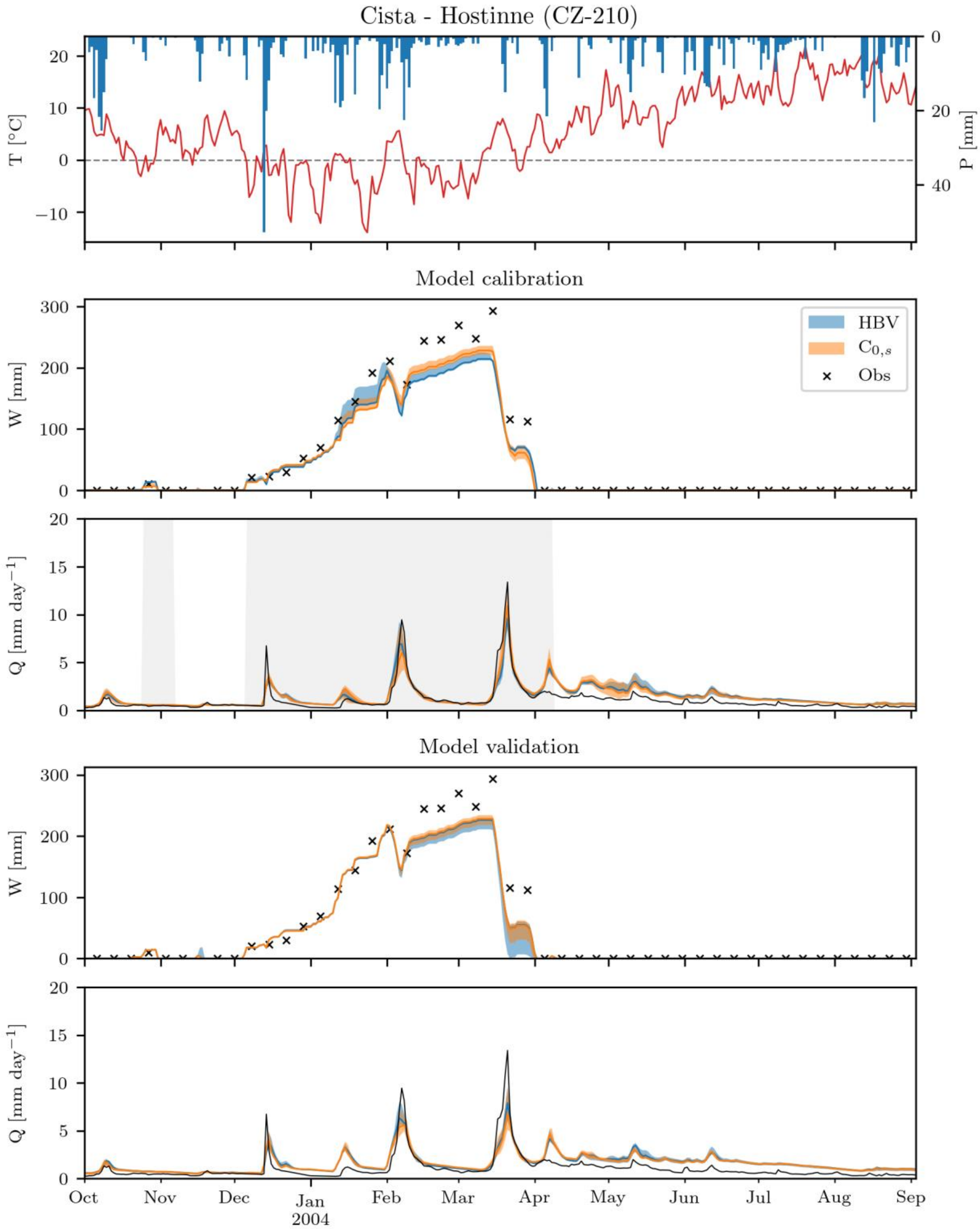

Cista - Hostinne (CZ-210)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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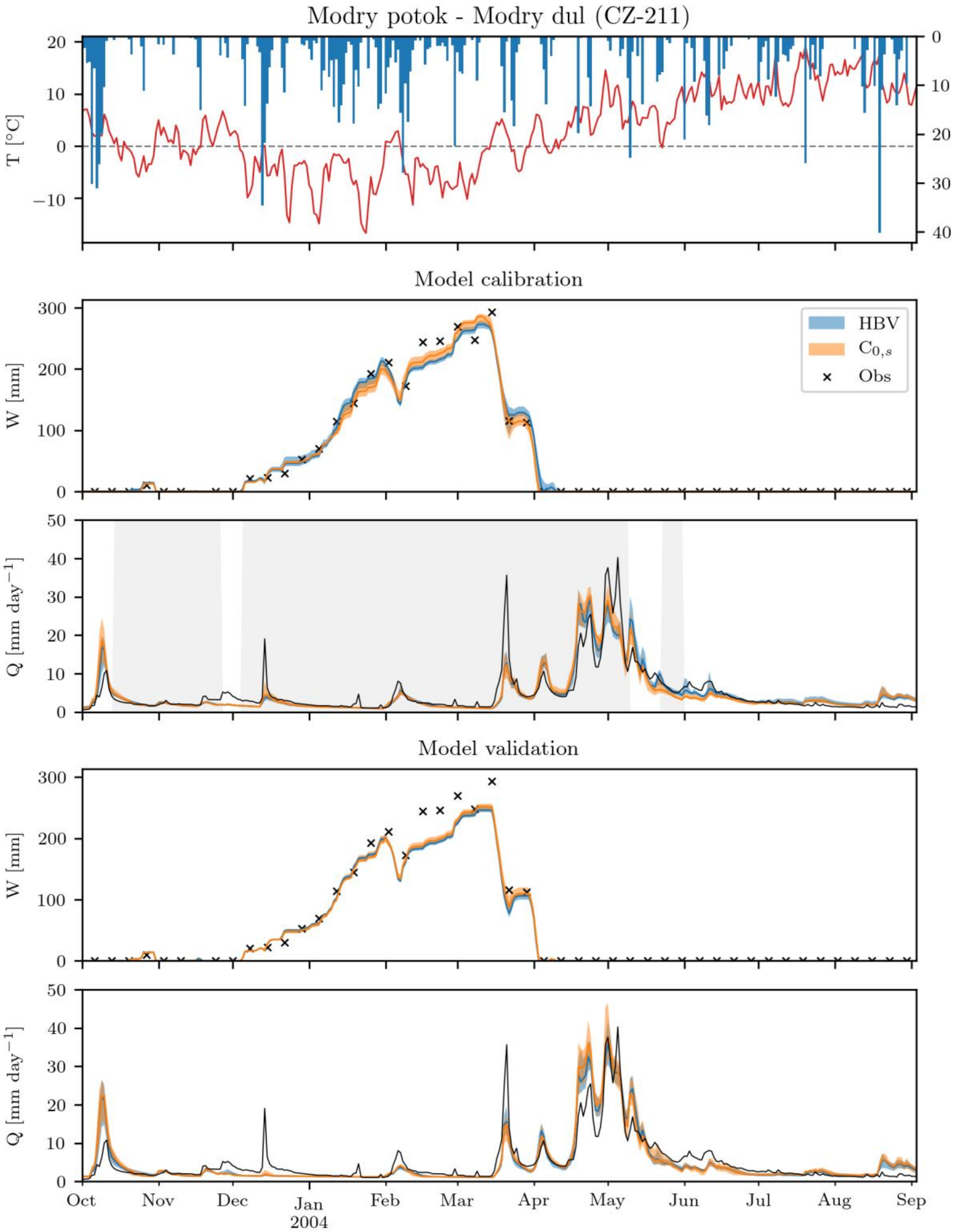

Modry potok - Modry dul (CZ-211)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
Oct
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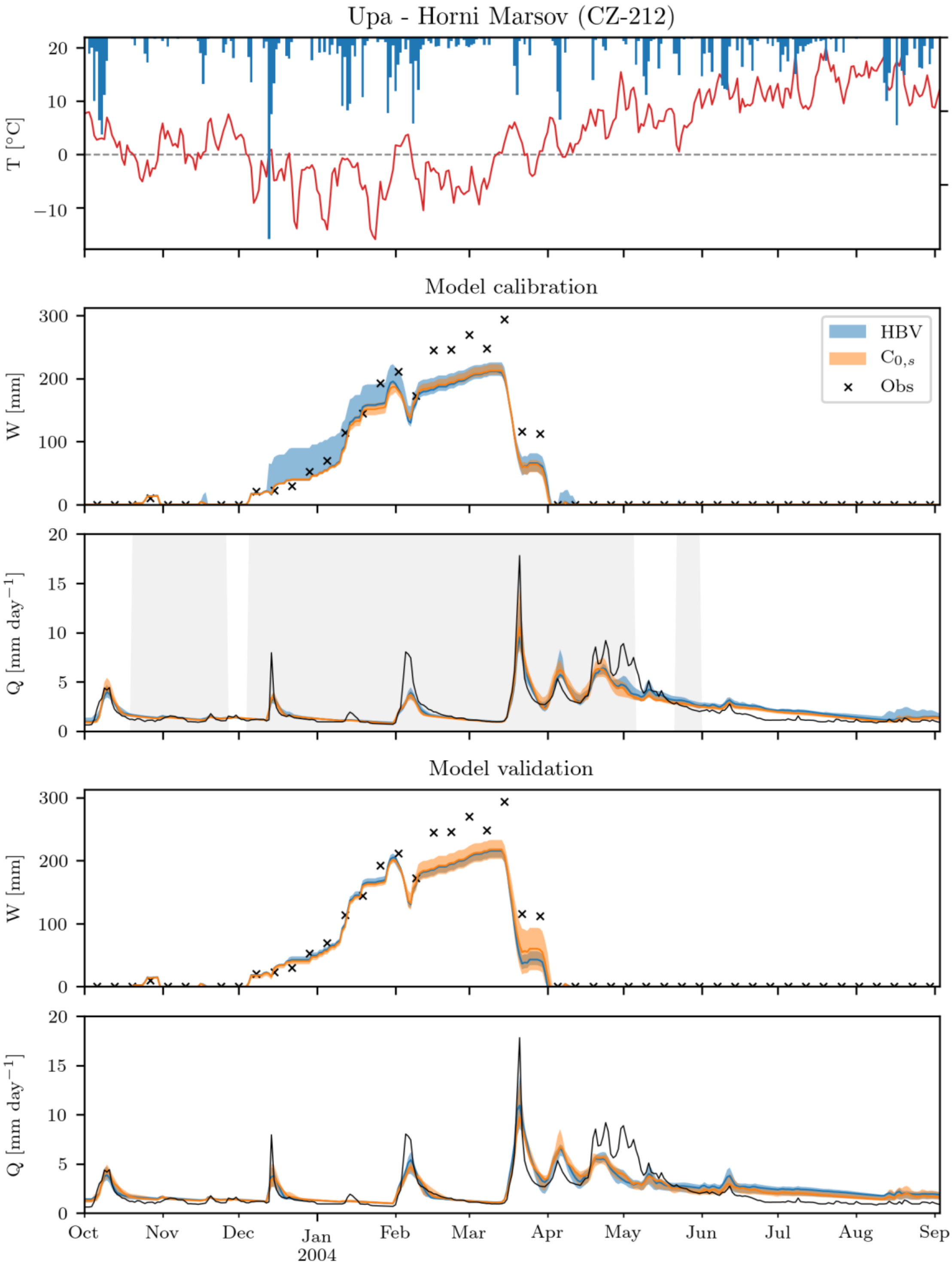

Upa - Horni Marsov (CZ-212)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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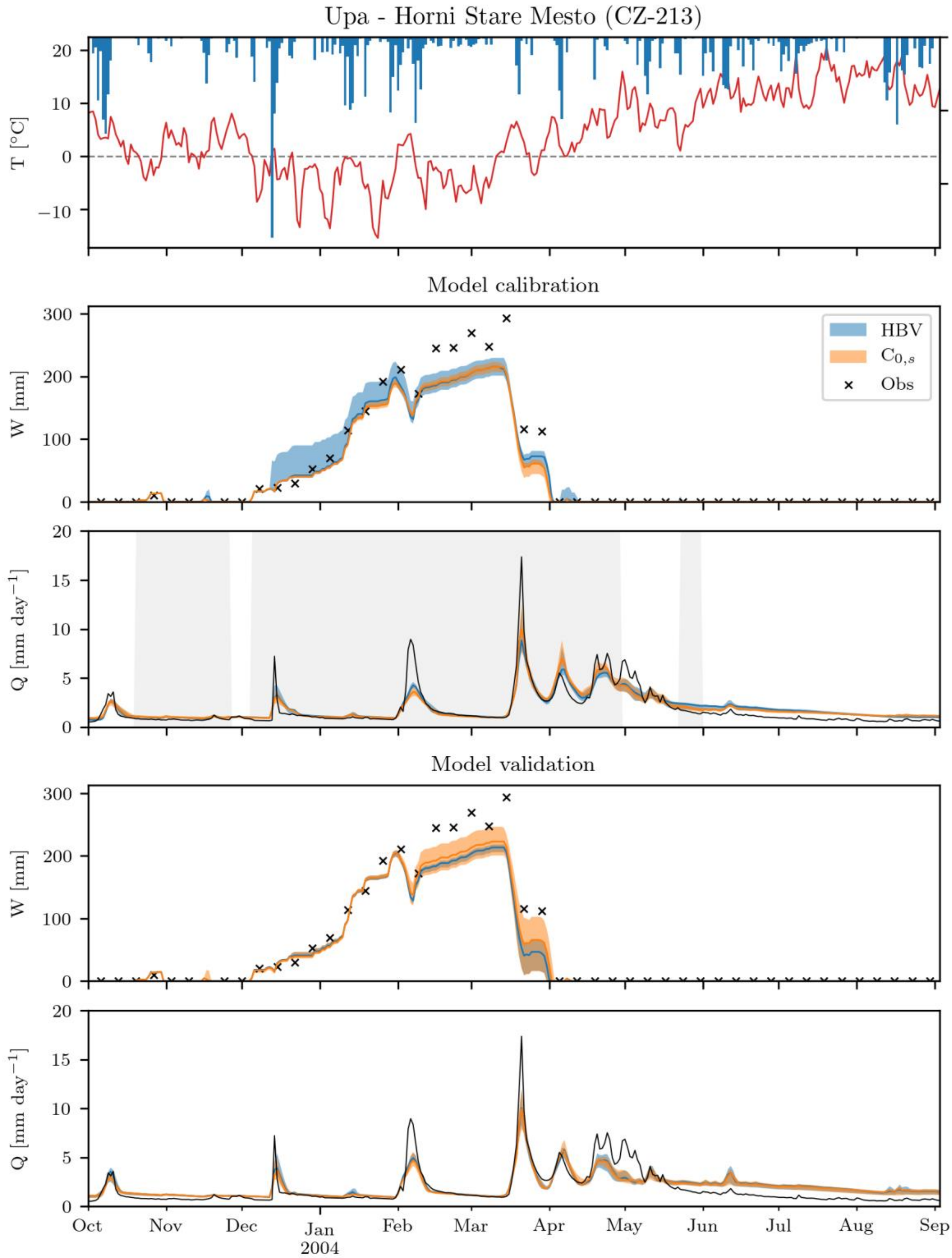

Upa - Horni Stare Mesto (CZ-213)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
C0,s
Obs
Q [mm day−1]
Model validation
W [mm]
Q [mm day−1]
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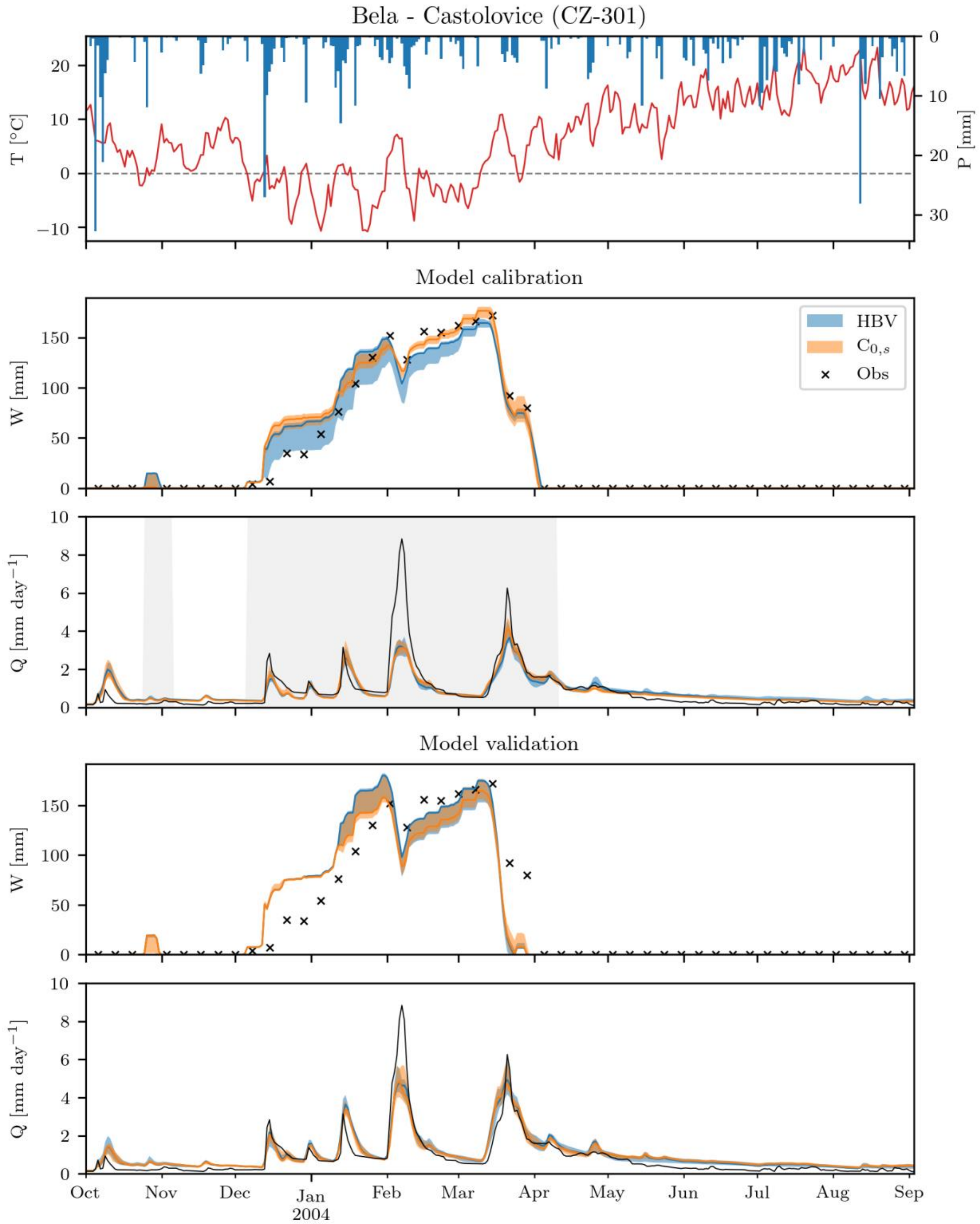

Bela - Castolovice (CZ-301)
T [°C]
P [mm]
Model calibration
W [mm]
Q [mm day^{-1}]
HBV
$C_{0,s}$
Obs
Model validation
W [mm]
Q [mm day^{-1}]
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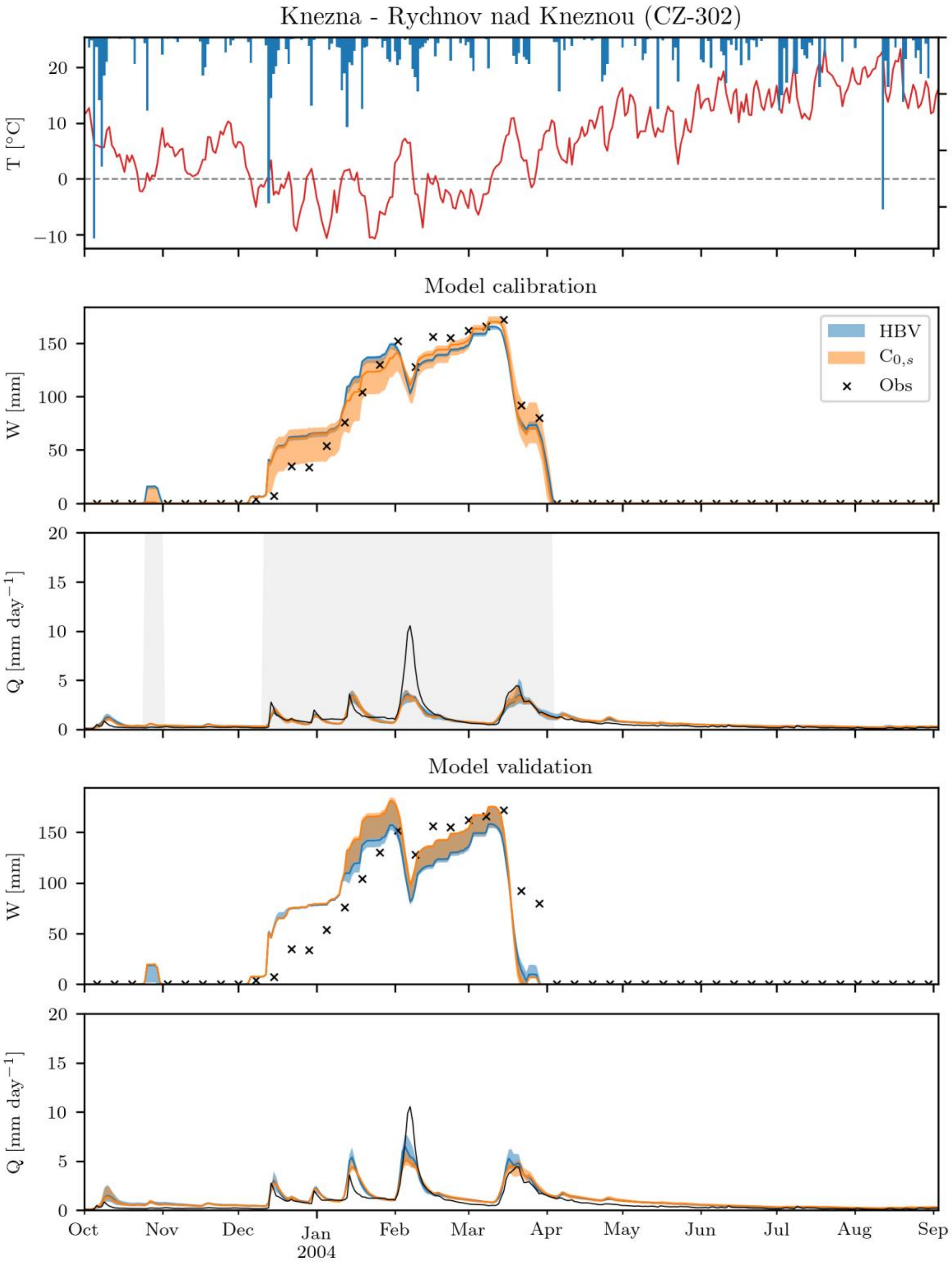

Knezna - Rychnov nad Kneznou (CZ-302)
T [°C]
P [mm]
Model calibration
W [mm]
Q [mm day^{-1}]
HBV
$C_{0,s}$
Obs
Model validation
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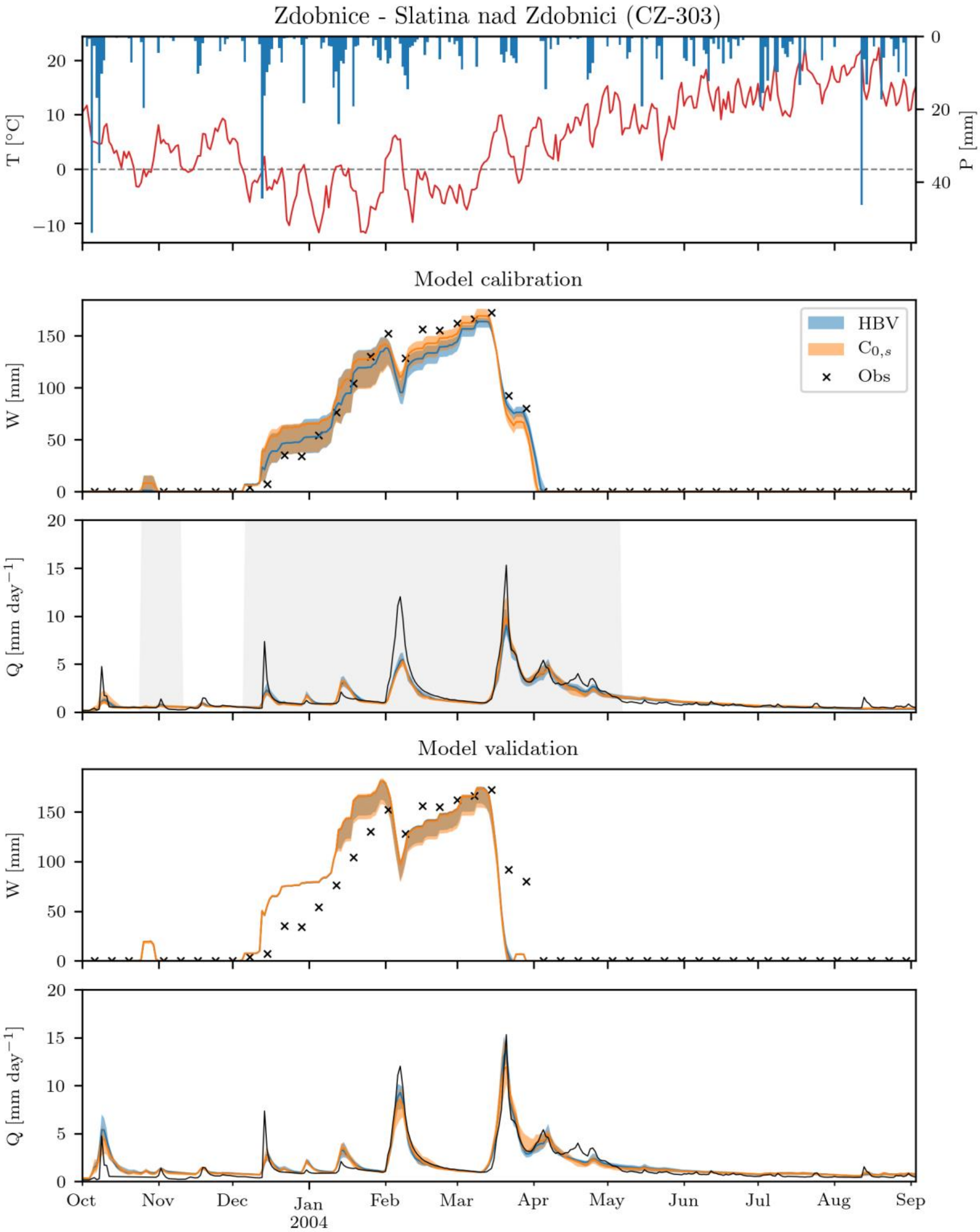

Zdobnice - Slatina nad Zdobnici (CZ-303)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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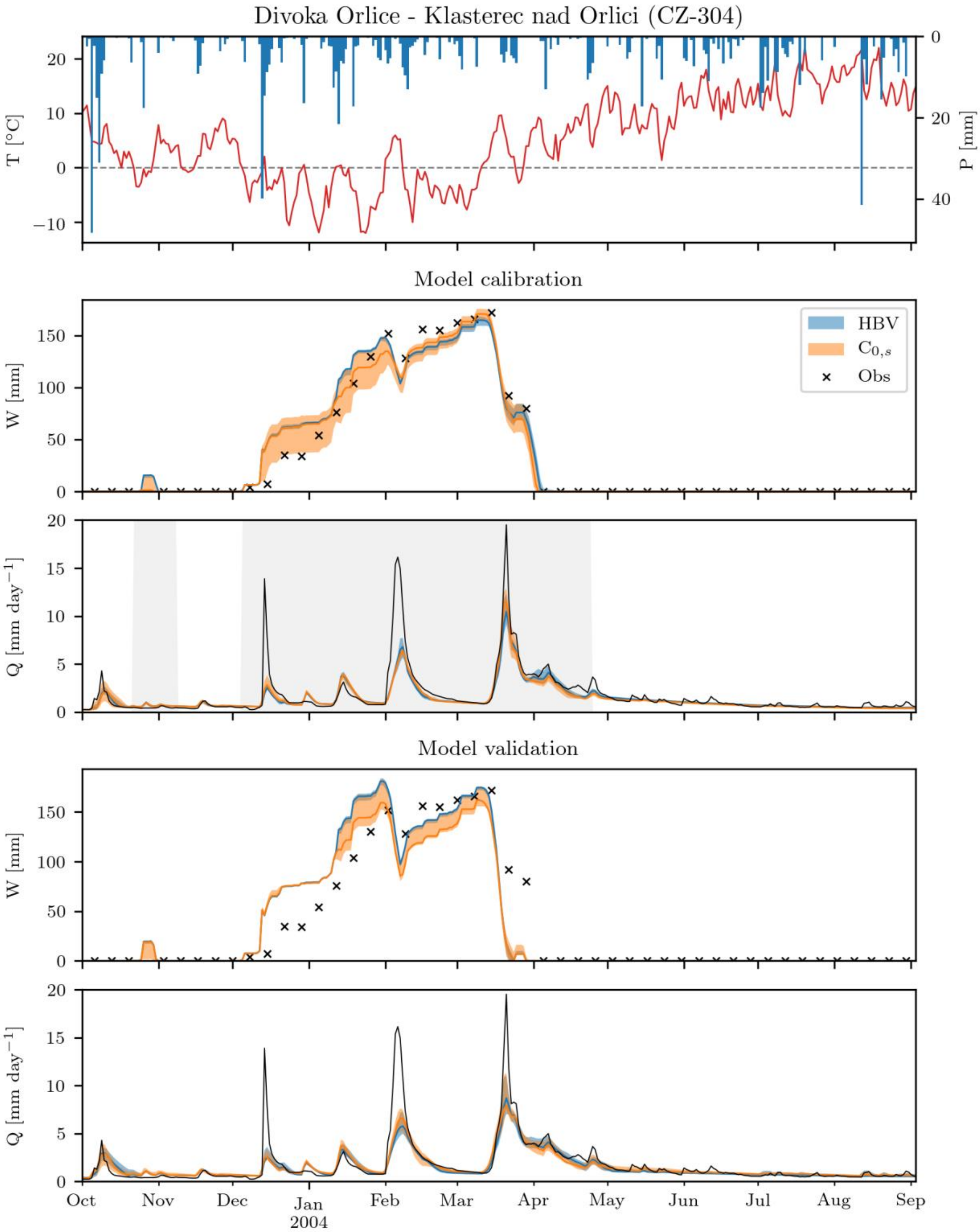

Divoka Orlice - Klasterec nad Orlici (CZ-304)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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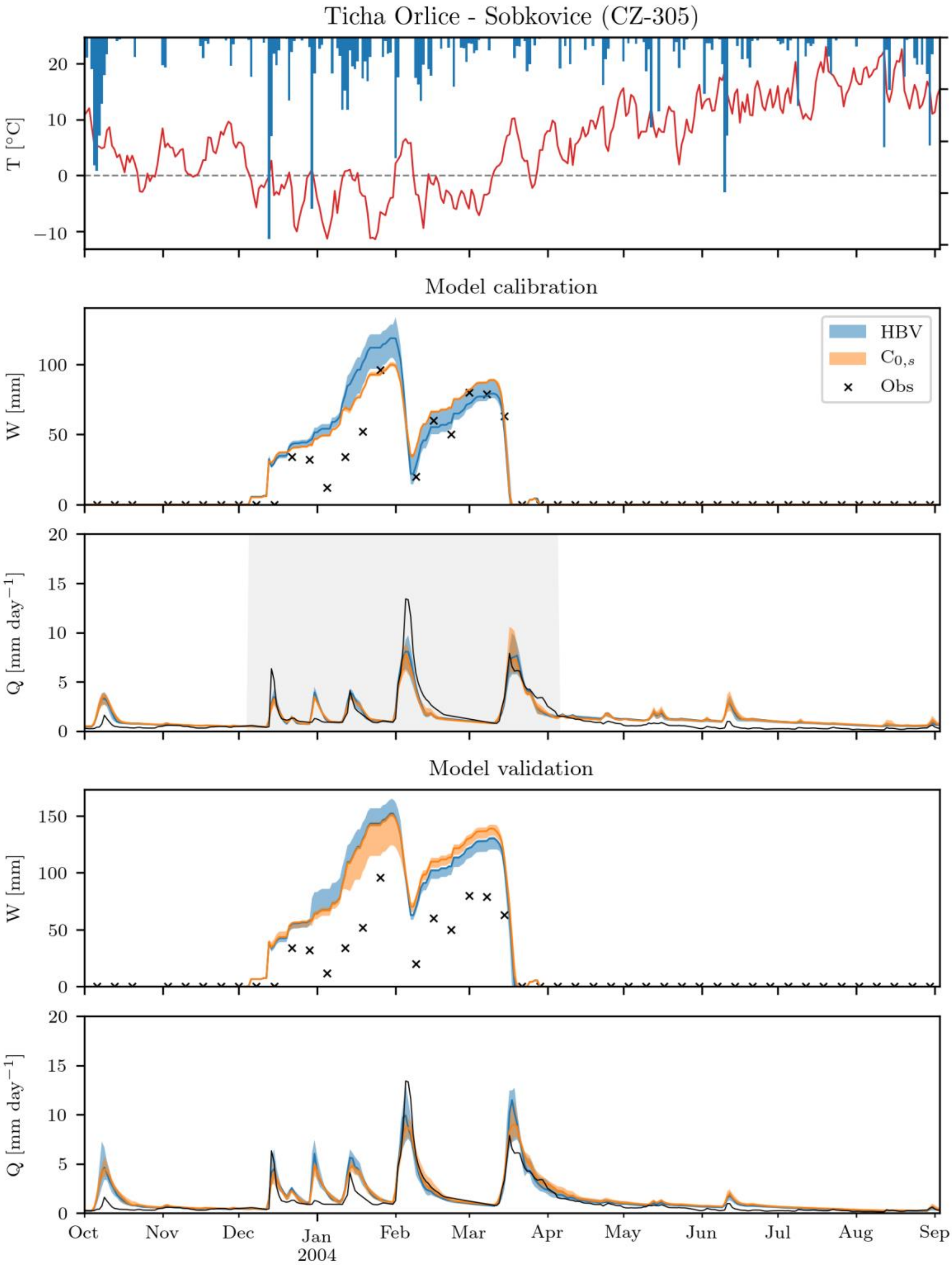

Ticha Orlice - Sobkovice (CZ-305)
T [°C]
P [mm]
Model calibration
W [mm]
Q [mm day^{-1}]
HBV
$C_{0,s}$
Obs
Model validation
W [mm]
Q [mm day^{-1}]
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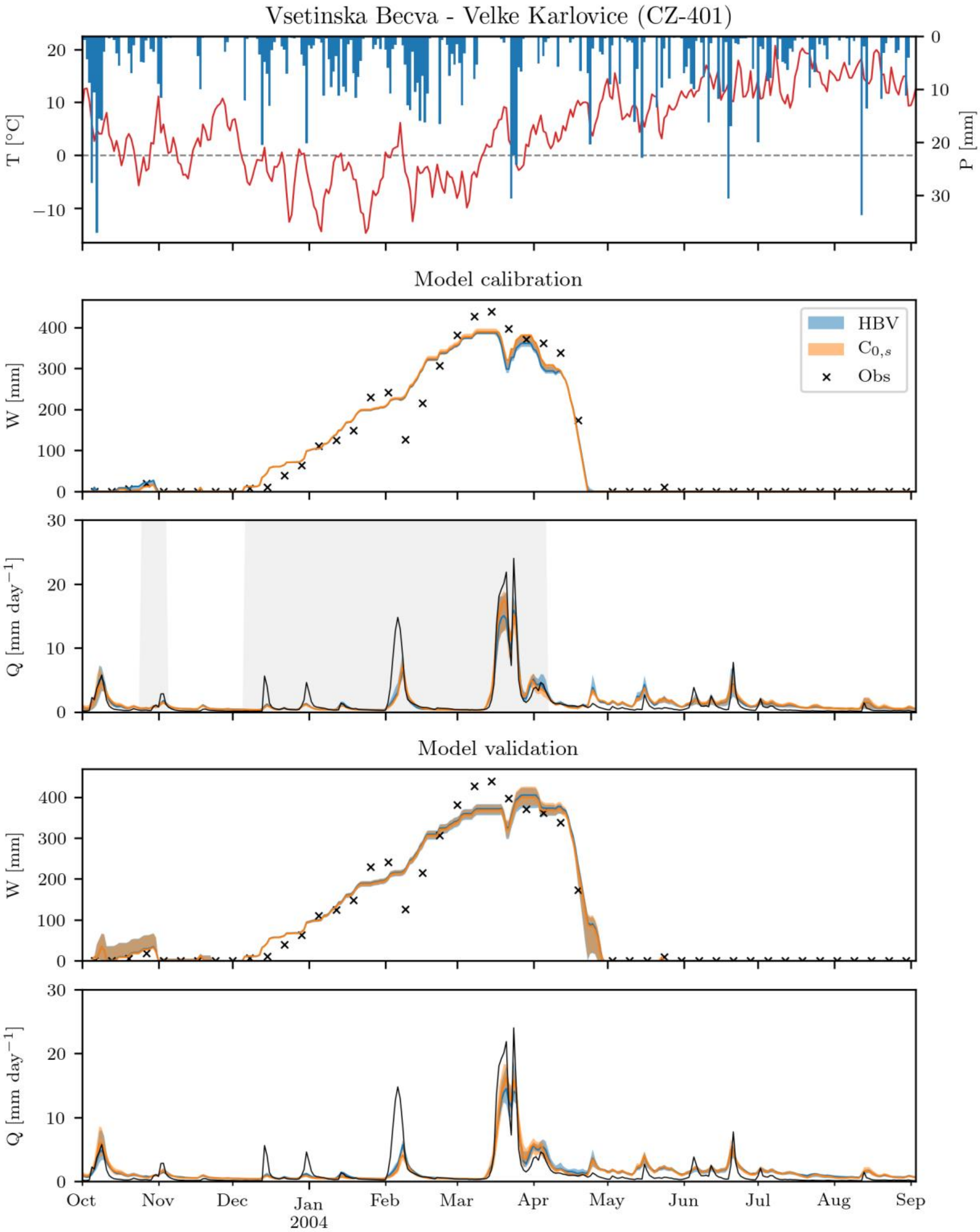

Vsetinska Becva - Velke Karlovice (CZ-401)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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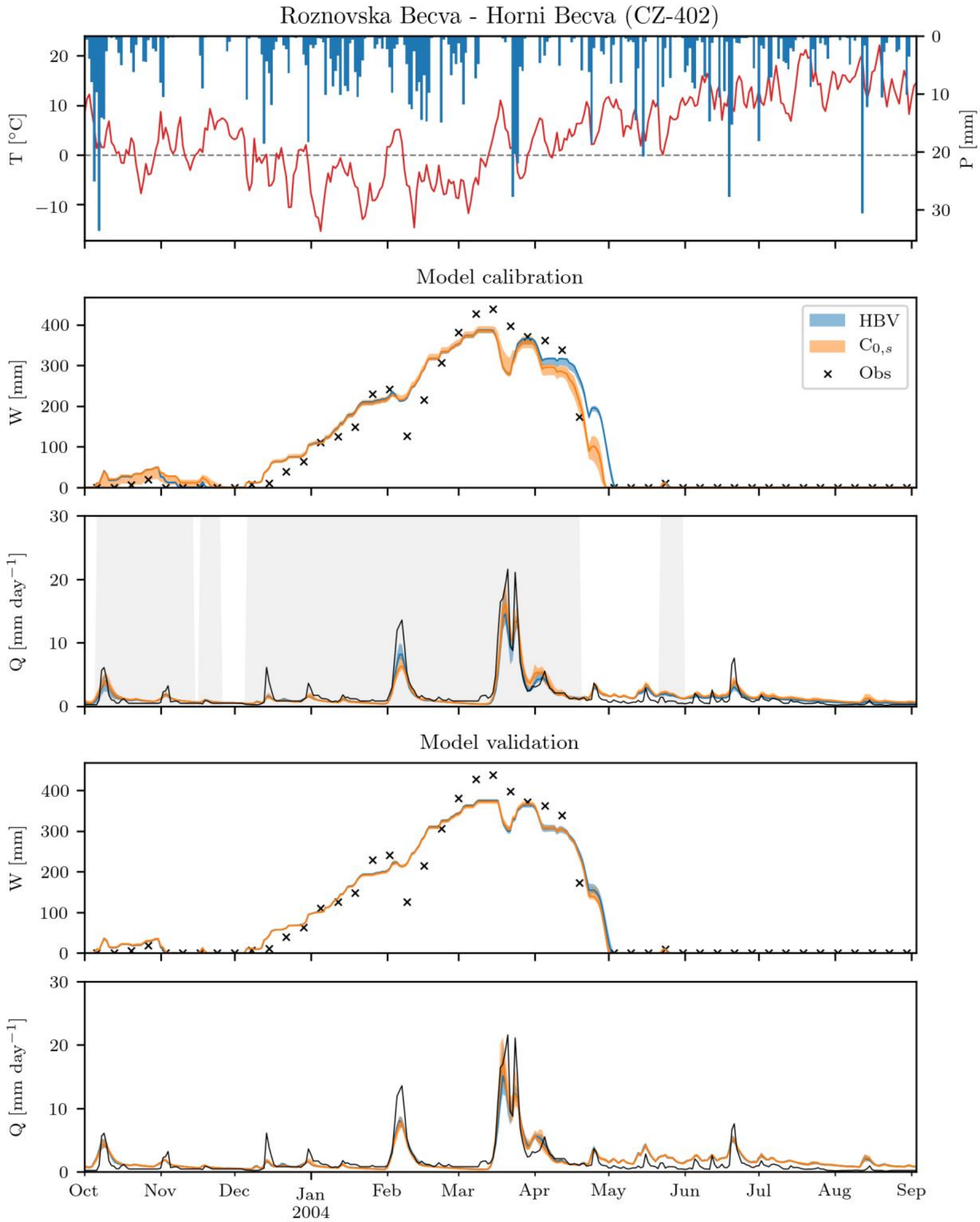

Roznovska Becva - Horni Becva (CZ-402)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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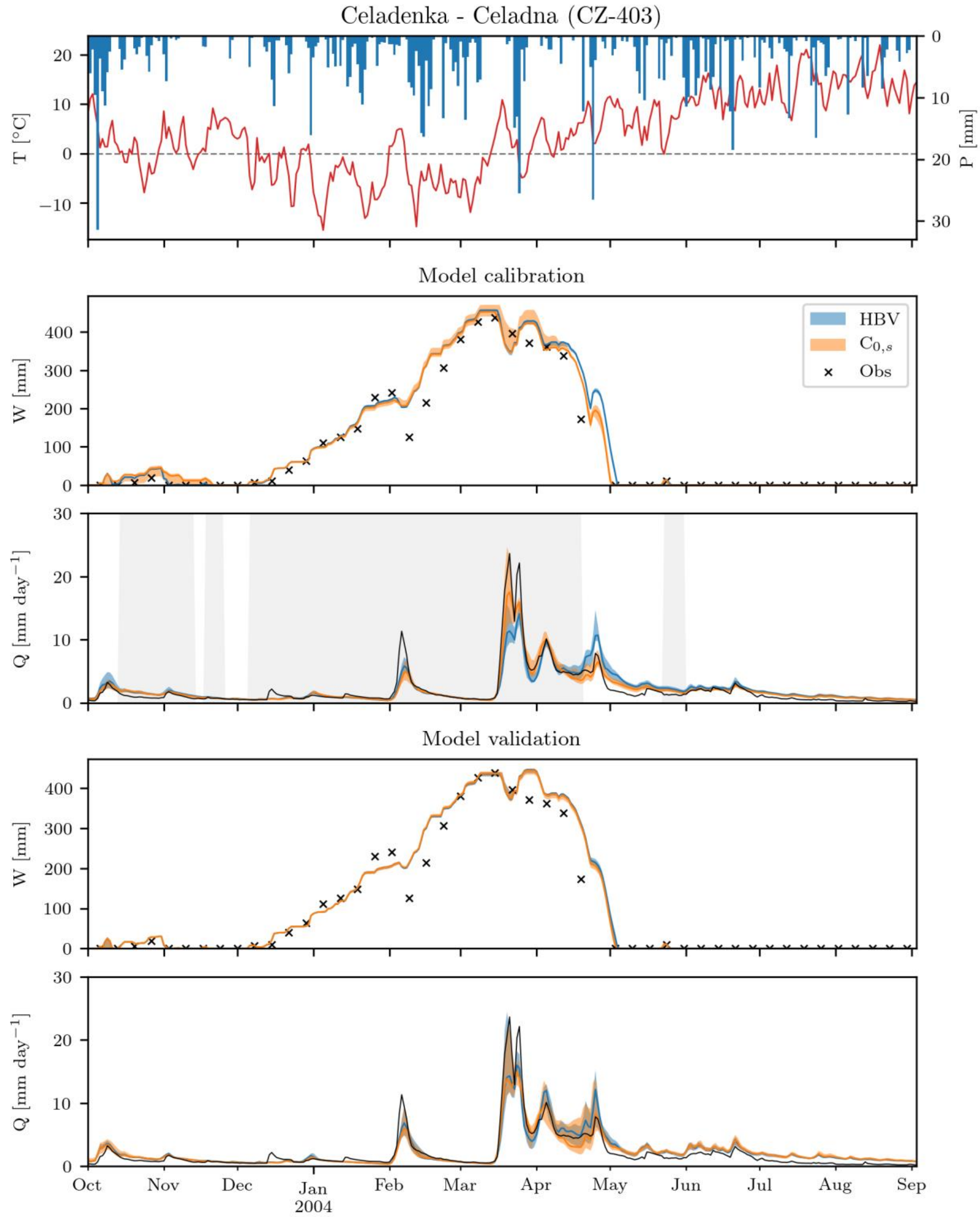

Celadenka - Celadna (CZ-403)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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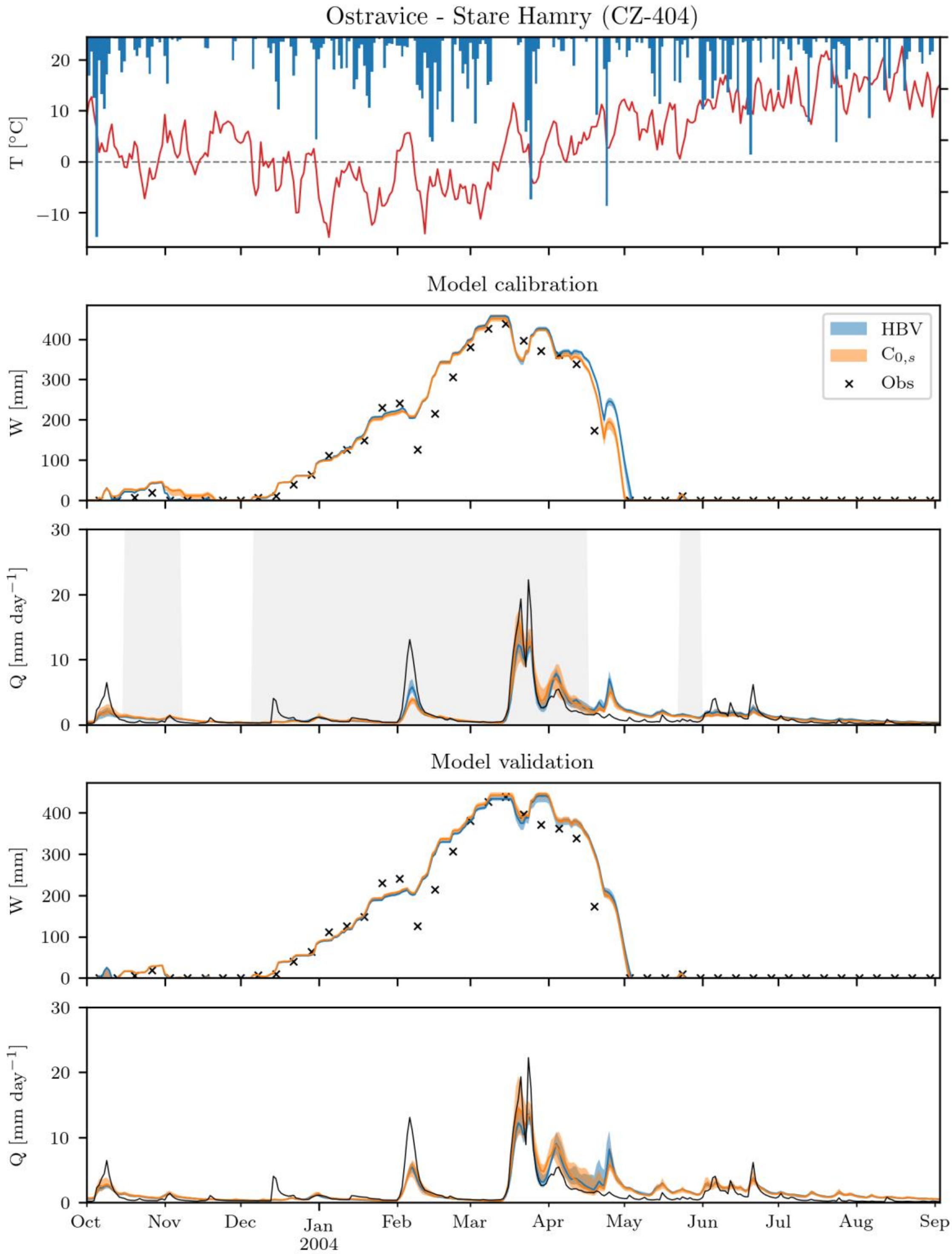

Ostravice - Stare Hamry (CZ-404)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
C0,s
Obs
Q [mm day−1]
Model validation
W [mm]
Q [mm day−1]
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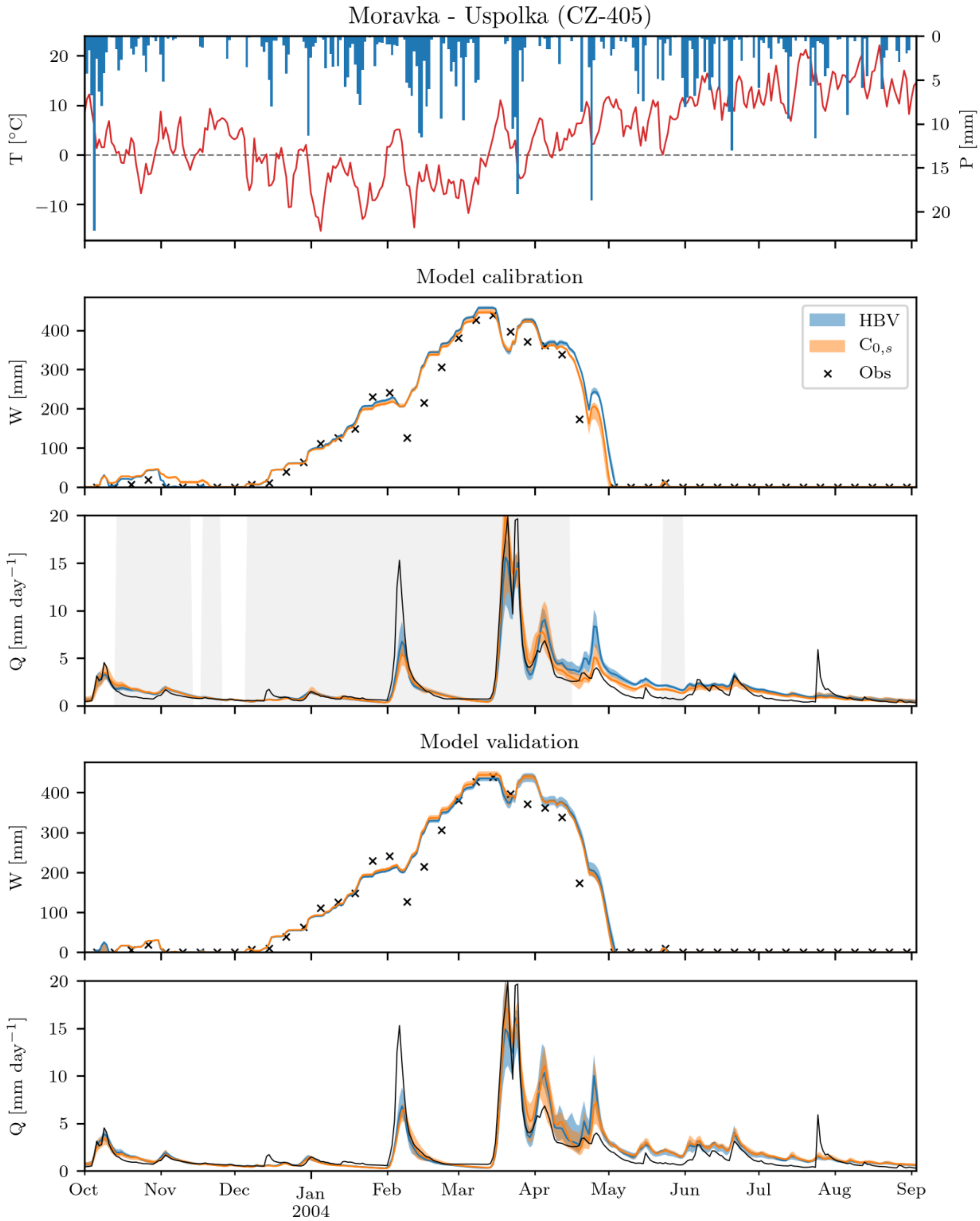

Moravka - Uspolka (CZ-405)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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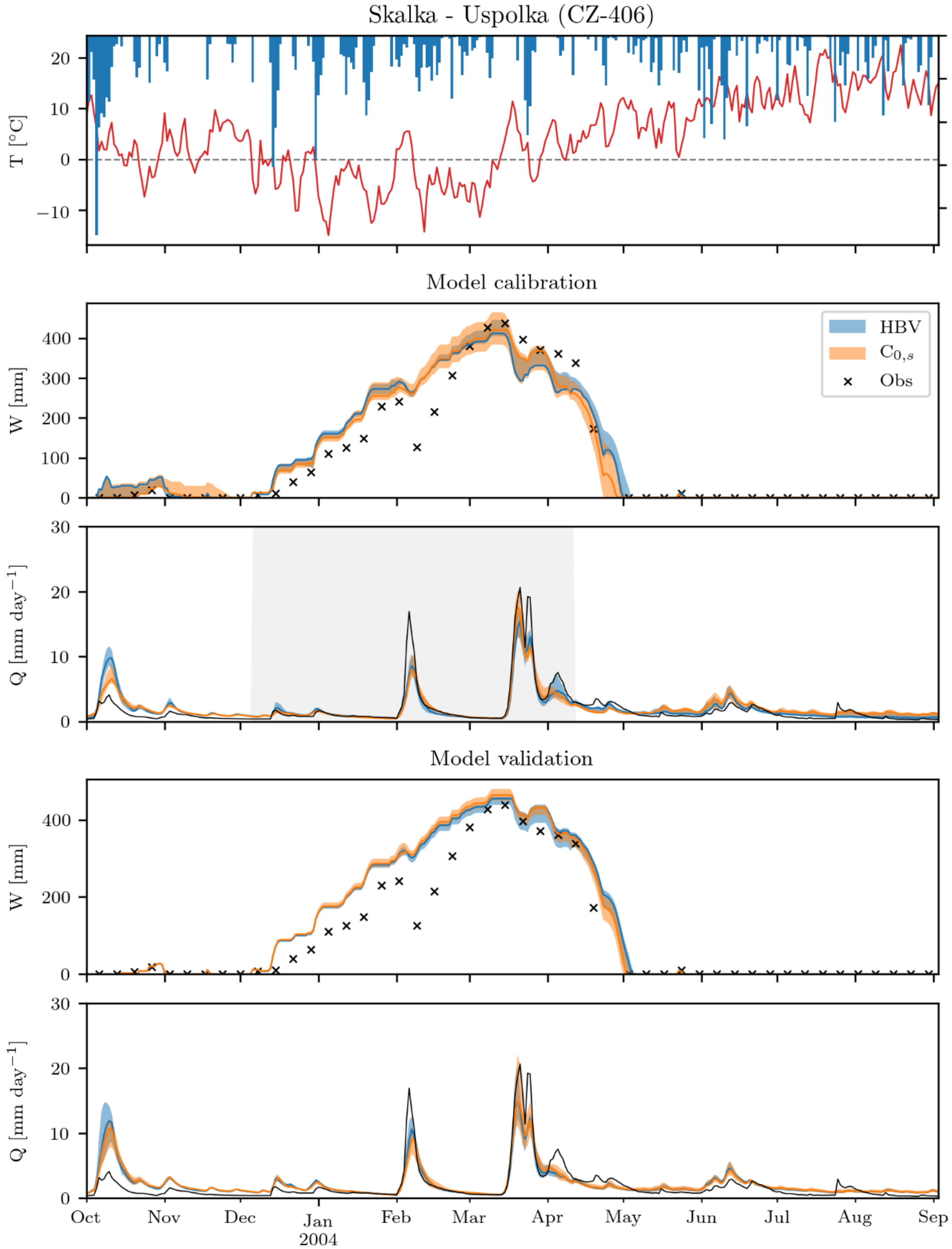

Skalka - Uspolka (CZ-406)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
$C_{0,s}$
Obs
Q [mm day^{-1}]
Model validation
W [mm]
Q [mm day^{-1}]
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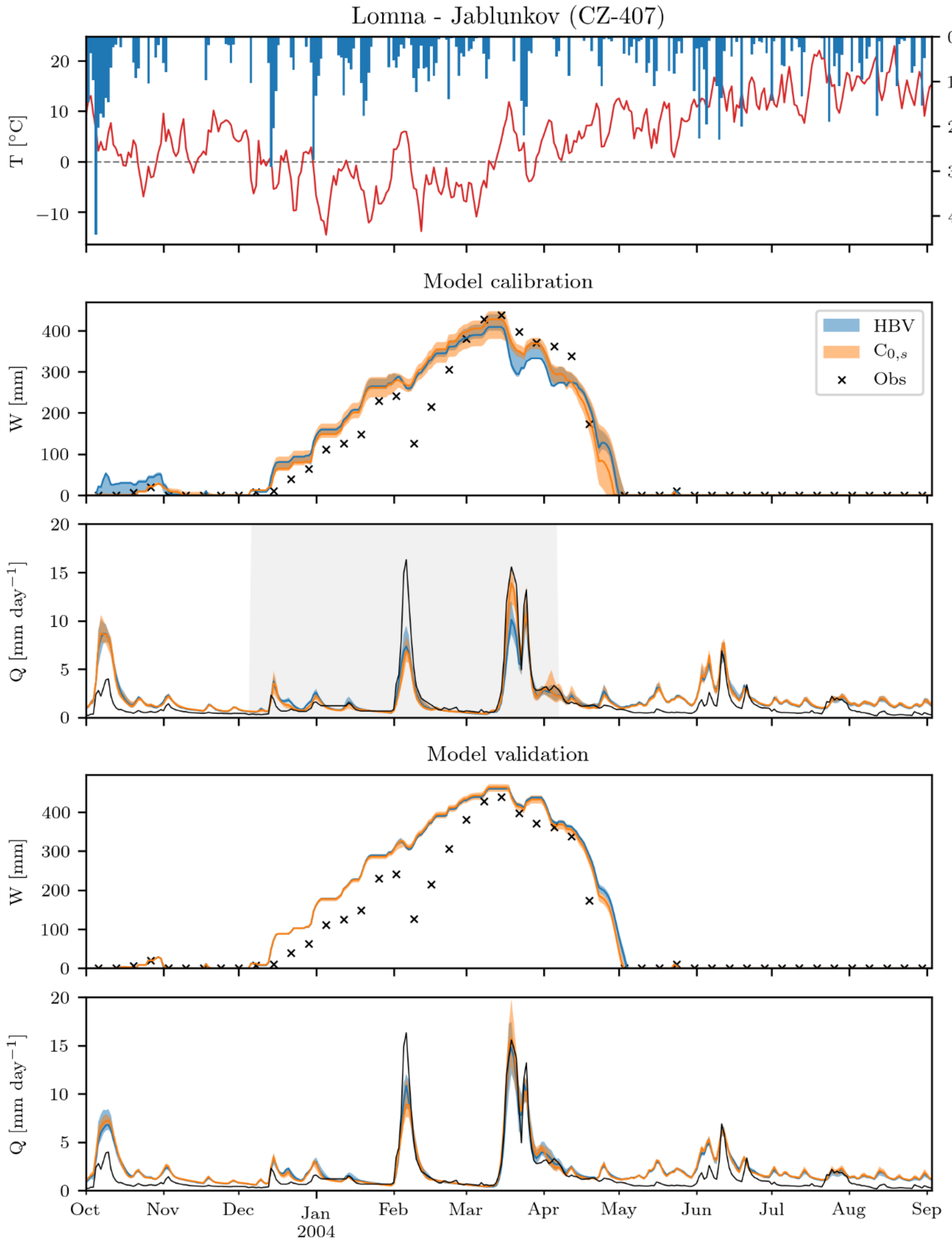
Lomna - Jablunkov (CZ-407)
T [°C]
P [mm]
Model calibration
W [mm]
HBV
C0,s
Obs
Q [mm day−1]
Model validation
W [mm]
Q [mm day−1]
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