**Additional File 7: Table S3.** Akaike information criteria (AIC), differences of AIC from best model (∆AIC) and Akaike weight for each model of sub-model B1 which used a generalized additive model for predicting the distribution of alpine vegetation zone. S(WI, TMC) shows interaction smoothing term of warmth index (WI, Kira 1948) and minimum temperature of the coldest month (TMC). S(PRS) and s(MSW) indicate the smoothing terms of summer (May-September) precipitation and maximum snow water equivalent (MSW). Null means a null model without explanatory variables.

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| --- | --- | --- | --- |
| Models | AIC | ∆AIC | Akaike weight |
| s(WI, TMC)+s(PRS)+s(MSW) | 24974.5 | 0.00 | 1.0 |
| s(WI, TMC)+s(MSW) | 25387.6 | 413.08 | 0.0 |
| s(WI, TMC)+s(PRS) | 26495.0 | 1520.45 | 0.0 |
| s(WI, TMC) | 26975.1 | 2000.61 | 0.0 |
| s(PRS)+s(MSW) | 46083.3 | 21108.75 | 0.0 |
| s(MSW) | 49503.4 | 24528.93 | 0.0 |
| s(PRS) | 57698.0 | 32723.51 | 0.0 |
| Null | 61362.7 | 36388.21 | 0.0 |