SUPPLEMENTARY MATERIAL

to the manuscript

Representation of precipitation and temperature by 8 ERA-Interim driven EURO-CORDEX regional climate models in Slovakia

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Table S1. Comparison of CARPATCLIM and ERA5-Land gridded datasets with station data (averaged for all stations), difference from station data is expressed as a ratio for precipitation and as a difference in °C for temperature, trends were calculated as a ratio/difference of 1962–1983 and 1984–2005 averages.

PR		CARPATCLIM	ERA5-Land
1961-2005 averages	Sum	1.01	1.21
	Sum MAM	0.99 - 1.02	1.12 - 1.30
	Sum JJA		
	Sum SON		
	Sum DJF	1.06	1.28
	Mean dwp	0.80 - 0.83	0.70 - 0.75
	Q90 dwp		
	Max		
	DWOP	0.81	0.48
ann. cycle amplitude		0.97	0.97
trends	Sum	0.97 - 1.02	0.94 - 1.00
	Sum MAM		
	Sum JJA		
	Sum SON		
	Sum DJF		
	Mean dwp		
	Q90 dwp		
	Max		
	DWOP	1.02	1.08

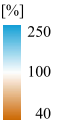
TAS		CARPATCLIM	ERA5-Land
1961-2005 averages	Mean	+0.1	-0.4
	Mean MAM	-0.1 - +0.3	-0.8 - -0.1
	Mean JJA		
	Mean SON		
	Mean DJF		
	Q10		
	Q90		
	Min	+1.1	-0.7
	Max	-0.8	-0.8
ann. cycle amplitude		-0.1	+0.8
trends	Mean	0.0	-0.1 - +0.2
	Mean MAM		
	Mean JJA		
	Mean SON		
	Mean DJF		
	Q10		
	Q90	+0.1 - +0.3	+0.5 - +0.7
	Min		
	Max		

TASMAX		CARPATCLIM	ERA5-Land
1961-2005 averages	Mean	-0.4	-1.7
	Q90	-0.7	-2.5
	Q90 JJA	-0.7	-2.7
	Max	-0.9	-2.6
ann. cycle amplitude		-0.3	-0.7
trends	Mean	0.0 - +0.2	0.0 - +0.2
	Q90		
	Max		

TASMIN		CARPATCLIM	ERA5-Land
1961-2005 averages	Mean	+0.2	+0.1
	Q10	+0.3	-0.3
	Q10 DJF	+0.9	-0.1
	Min	+1.4	-0.3
ann. cycle amplitude		-0.1	+1.4
trends	Mean	0.0	+0.1 - +0.7
	Q10		
	Min		

Table S2. 1989–2005 averaged bias (expressed as a ratio in % of RCMs and OBS) of precipitation statistics over the 'lowlands' subregion; values in bold indicate bias larger than the observed interannual standard deviation.

	Sum	Sum MAM	Sum JJA	Sum SON	Sum DJF	DWOP	Q10 dwp	Q50 dwp	Q90 dwp	Q95 dwp	Max
AL	91	107	**64**	105	104	105	84	**75**	98	104	107
CC	100	121	70	98	136	103	115	101	99	103	115
CO	**82**	101	**49**	85	121	**120**	107	98	100	104	110
HA	107	119	77	105	**160**	**79**	83	**71**	87	93	110
HI	103	98	87	111	131	106	106	95	107	113	**134**
RA	101	107	81	97	**138**	**86**	90	**74**	87	91	109
RE	104	114	90	99	127	101	91	99	104	106	114
WR	**126**	**154**	118	112	130	**84**	122	**119**	105	103	97
AVG	102	115	80	101	131	98	100	91	98	102	112



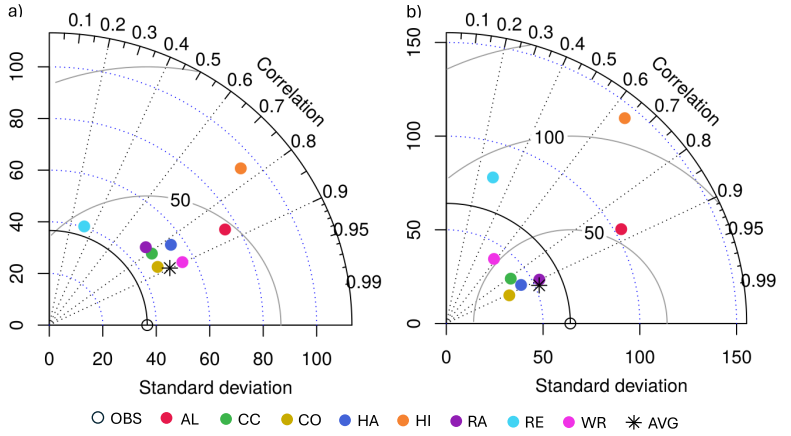


Fig. S1. Taylor diagram of observed and RCM-simulated 1989-2005 averaged a) precipitation *SumDJF* and b) precipitation *SumJJA* fields.

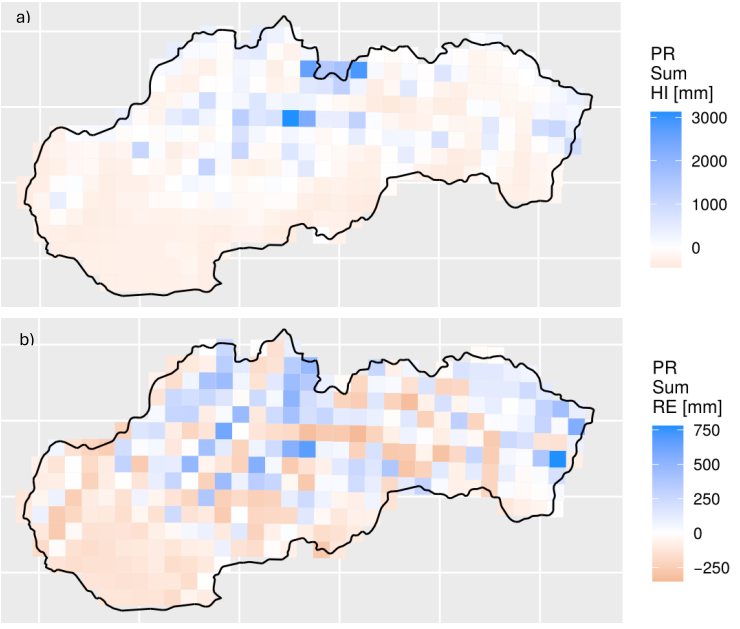


Fig. S2. 1989–2005 averaged precipitation Sum spatial fields (individual grid point differences from the 1989–2005 Slovakia average) for a) HI, b) RE.

Table S3. 1989–2005 averaged bias (expressed as a difference of RCMs and OBS) of a) TAS, b) TASMAX, c) TASMIN statistics over the *'mountains'* subregion; values in bold indicate bias larger than observed interannual standard deviation.

a)	Mean	Mean MAM	Mean JJA	Mean SON	Mean DJF	Sd MAM	Sd JJA	Sd SON	Sd DJF	Min	Q10 DJF	Q90 JJA	Max
AL	-0.1	-0.1	**1.2**	0.0	**-1.6**	0.0	**0.5**	0.3	0.2	**-3.0**	-1.8	**1.9**	**3.2**
CC	-0.3	-0.6	0.7	-0.3	-0.9	0.3	0.4	0.5	-0.2	-1.5	-0.8	1.2	**2.9**
CO	**0.6**	0.8	**1.5**	0.4	-0.3	0.5	**0.5**	0.6	-0.4	-0.4	0.1	**2.3**	**3.1**
HA	-0.5	-0.6	**1.0**	-0.3	**-2.3**	0.3	0.3	0.7	**0.8**	**-6.0**	**-3.5**	**1.4**	**1.6**
HI	**-0.9**	-0.5	-0.6	**-1.0**	**-1.6**	0.4	0.1	0.3	0.2	**-2.7**	-1.9	-0.3	-0.6
RA	**-1.8**	**-2.2**	-0.8	**-1.7**	**-2.7**	0.6	0.1	0.5	0.5	**-4.4**	**-3.8**	-0.6	-0.3
RE	**0.7**	**1.1**	**1.3**	0.7	-0.2	0.2	0.1	0.6	0.0	-1.2	0.0	**1.2**	**1.9**
WR	-0.3	-0.6	**1.4**	-0.7	**-1.4**	1.0	**0.6**	**1.2**	0.4	**-3.6**	-1.8	**2.3**	**2.7**
AVG	-0.3	-0.3	0.7	-0.4	**-1.4**	0.4	0.3	0.6	0.2	**-2.8**	-1.7	1.2	**1.8**

b)	Mean	Mean MAM	Mean JJA	Mean SON	Mean DJF	Sd MAM	Sd JJA	Sd SON	Sd DJF	Min	Q10 DJF	Q90 JJA	Max
AL	-0.3	-0.6	0.7	0.0	**-1.5**	-0.4	0.5	0.4	-0.1	**-2.8**	-1.5	1.4	**2.9**
CC	**-1.3**	**-1.7**	-0.1	**-1.2**	**-2.2**	0.3	0.4	0.5	-0.4	**-2.9**	**-1.9**	0.4	**2.0**
CO	-0.4	-0.1	0.7	-0.4	**-1.7**	0.4	0.3	0.7	-0.6	-1.8	-1.1	1.2	**2.2**
HA	**-0.8**	**-1.3**	0.7	-0.5	**-2.1**	0.1	0.4	**0.8**	-0.5	-2.0	**-1.6**	1.2	**1.8**
HI	**-2.1**	**-1.6**	**-2.1**	**-2.1**	**-2.4**	0.0	0.0	0.0	-0.2	**-3.5**	**-2.3**	**-2.1**	**-2.4**
RA	**-1.5**	**-1.6**	**-1.2**	**-1.4**	**-2.1**	0.1	0.1	0.4	0.0	**-3.4**	**-2.5**	-1.0	-0.5
RE	**1.1**	**1.8**	**2.2**	**1.3**	-1.0	0.6	0.2	**1.4**	0.0	-0.8	-0.5	**2.2**	**3.1**
WR	**-1.1**	**-1.5**	0.6	**-1.0**	**-2.4**	0.8	0.1	**1.1**	0.2	**-5.0**	**-2.7**	0.8	1.2
AVG	**-0.8**	-0.8	0.2	-0.7	**-1.9**	0.3	0.2	0.7	-0.2	**-2.8**	**-1.8**	0.5	**1.3**

c)	Mean	Mean MAM	Mean JJA	Mean SON	Mean DJF	Sd MAM	Sd JJA	Sd SON	Sd DJF	Min	Q10 DJF	Q90 JJA	Max
AL	-0.3	-0.2	0.5	0.1	**-1.6**	0.0	0.3	0.0	0.2	-1.9	-1.9	**1.2**	**2.0**
CC	**0.8**	0.6	**1.6**	**0.9**	0.2	0.3	**0.4**	0.5	-0.2	1.0	0.5	**2.2**	**4.0**
CO	**1.6**	**1.8**	**2.2**	**1.5**	0.9	0.5	**0.6**	0.5	-0.4	1.7	1.5	**3.2**	**4.3**
HA	**-0.8**	-0.6	0.7	-0.1	**-3.3**	0.8	0.0	**1.0**	**2.1**	**-8.6**	**-6.4**	0.9	1.2
HI	0.1	0.4	**0.8**	0.3	-1.0	0.9	0.0	0.6	**0.7**	-2.3	-2.0	**1.0**	**1.3**
RA	**-2.4**	**-3.2**	**-1.3**	**-2.0**	**-3.3**	1.0	0.2	0.8	**0.9**	**-4.3**	**-4.7**	-0.8	-0.5
RE	**0.9**	**1.2**	**0.9**	**1.0**	0.4	-0.1	-0.1	0.3	**0.9**	**-3.8**	-0.8	**1.0**	**1.7**
WR	0.2	-0.1	**1.6**	-0.1	-0.6	1.0	**0.8**	**1.1**	0.4	-1.8	-0.9	**3.0**	**3.8**
AVG	0.0	0.0	**0.9**	0.2	-1.0	0.5	0.3	0.6	0.6	**-2.5**	-1.8	**1.5**	**2.2**

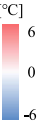
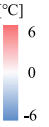


Table S4. 1989–2005 averaged bias (expressed as a difference of RCMs and OBS) of a) TAS, b) TASMAX, c) TASMIN statistics over the *'lowlands'* subregion; values in bold indicate bias larger than observed interannual standard deviation.

a)	Mean	Mean MAM	Mean JJA	Mean SON	Mean DJF	Sd MAM	Sd JJA	Sd SON	Sd DJF	Min	Q10 DJF	Q90 JJA	Max
AL	**1.2**	**1.0**	**2.9**	**0.9**	-0.1	0.2	**1.1**	0.7	-0.4	0.4	0.8	**4.4**	**5.7**
CC	-0.3	-0.7	0.9	-0.2	-1.0	0.4	**0.5**	0.6	-0.3	-0.6	-0.6	**1.5**	**2.9**
CO	**0.8**	0.6	**2.0**	0.4	0.1	0.5	**0.8**	0.7	-0.5	1.1	0.8	**3.2**	**4.1**
HA	0.2	-0.6	**1.4**	0.4	-0.3	0.0	**0.6**	0.4	-0.1	-1.6	-0.1	**2.2**	**2.9**
HI	-0.2	0.5	0.3	-0.4	-1.2	0.2	0.2	0.4	0.5	-1.3	-1.9	0.7	0.6
RA	**-1.9**	**-2.4**	**-1.0**	**-1.5**	**-2.7**	0.7	0.3	0.4	0.0	**-3.2**	**-2.8**	-0.4	0.0
RE	**0.6**	0.8	**1.1**	0.7	-0.1	-0.1	0.3	0.4	-0.5	0.5	1.1	**1.4**	**2.0**
WR	-0.2	-0.7	**1.2**	-0.6	-0.8	0.6	**0.7**	0.9	0.1	-2.0	-0.9	**2.1**	**2.5**
AVG	0.0	-0.2	**1.1**	0.0	-0.8	0.3	**0.6**	0.6	-0.1	-0.8	-0.4	**1.9**	**2.6**

b)	Mean	Mean MAM	Mean JJA	Mean SON	Mean DJF	Sd MAM	Sd JJA	Sd SON	Sd DJF	Min	Q10 DJF	Q90 JJA	Max
AL	**1.4**	0.8	**2.6**	**1.5**	0.5	-0.1	**1.0**	0.6	-0.2	0.4	1.0	**4.0**	**5.7**
CC	**-1.2**	**-1.8**	-0.2	**-1.0**	**-1.9**	0.0	0.5	0.5	-0.5	**-1.8**	-1.4	0.5	**2.6**
CO	0.2	-0.3	**1.7**	0.0	-0.8	0.1	**0.9**	0.8	-0.5	-0.1	0.0	**3.2**	**4.5**
HA	-0.4	**-1.8**	1.2	0.2	-1.0	-0.2	**0.8**	0.9	-0.3	-1.0	-0.7	**2.4**	**3.7**
HI	**-1.3**	-0.7	**-1.4**	**-1.5**	**-1.6**	-0.3	-0.2	0.1	0.3	**-2.4**	**-2.2**	-1.5	**-1.6**
RA	**-1.4**	**-1.8**	**-1.5**	-0.7	-1.5	-0.1	0.2	0.2	-0.2	**-2.0**	-1.4	-1.1	-0.3
RE	0.5	0.6	1.0	**1.0**	-0.8	-0.2	0.4	0.9	0.1	0.4	-0.4	1.3	**2.7**
WR	0.1	-0.7	**1.3**	0.3	-0.5	0.1	0.5	**1.1**	0.2	**-2.3**	-0.7	**2.1**	**3.0**
AVG	-0.3	-0.7	0.6	0.0	-0.9	-0.1	0.5	0.6	-0.1	-1.1	-0.7	1.3	**2.5**



c)	Mean	Mean MAM	Mean JJA	Mean SON	Mean DJF	Sd MAM	Sd JJA	Sd SON	Sd DJF	Min	Q10 DJF	Q90 JJA	Max
AL	**0.7**	0.5	**2.0**	0.4	-0.2	0.1	**0.8**	0.4	-0.6	1.3	1.0	**3.3**	**4.5**
CC	**0.9**	0.5	**1.9**	**1.0**	0.0	0.4	**0.4**	0.5	-0.5	2.1	0.8	**2.5**	**3.6**
CO	**1.5**	**1.7**	**2.1**	**1.1**	1.0	0.5	**0.5**	0.4	**-0.8**	**3.5**	2.2	**3.2**	**3.8**
HA	0.4	0.2	**1.0**	0.6	0.1	-0.1	**0.3**	0.0	0.4	**-3.4**	0.0	**1.6**	**2.3**
HI	**1.1**	**1.8**	**2.1**	**1.1**	-0.6	0.4	0.1	0.5	0.2	1.0	-0.6	**2.5**	**2.7**
RA	**-2.4**	**-3.1**	**-1.1**	**-1.7**	**-3.7**	**1.1**	0.3	0.5	0.3	**-3.4**	**-3.9**	-0.5	-0.1
RE	**1.3**	**1.5**	**1.7**	**1.2**	0.8	-0.2	0.1	0.0	-0.6	0.3	2.2	**1.9**	**2.3**
WR	**-0.8**	**-1.0**	0.1	**-1.2**	-1.0	0.3	**0.5**	0.5	0.1	-1.0	-0.9	**1.0**	**1.4**
AVG	0.3	0.3	**1.2**	0.3	-0.4	0.3	**0.4**	0.3	-0.2	0.1	0.1	**1.9**	**2.5**

Table S5. a) Correlations of TASMAX statistics with elevation – observations and RCM ensemble average; b) Difference between RCM-simulated and observed correlations strengths (individual RCMs and ensemble average); values in italics indicate simulated correlation of opposite sign than observed.

a)	Mean	Mean MAM	Mean JJA	Mean SON	Mean DJF	Sd MAM	Sd JJA	Sd SON	Sd DJF	Min	Q10 DJF	Q90 JJA	Max
OBS	**-0.97**	**-0.98**	**-0.98**	**-0.98**	**-0.84**	**-0.21**	**0.03**	**-0.93**	**-0.25**	**-0.80**	**-0.85**	**-0.98**	**-0.98**
AVG	-0.96	-0.97	-0.96	-0.96	-0.86	*0.23*	*-0.46*	-0.81	-0.36	-0.86	-0.87	-0.96	-0.97
b)													
AL	0.01	0.01	0.00	0.00	0.07	0.45	*-0.86*	0.02	0.01	0.15	0.08	0.00	0.01
CC	0.00	0.00	-0.02	0.00	0.05	*-0.58*	*-0.43*	-0.04	0.08	0.08	0.05	-0.02	-0.02
CO	-0.01	0.00	-0.03	0.00	0.07	*-0.49*	*-0.86*	-0.03	0.16	0.14	0.08	-0.03	-0.02
HA	0.00	0.00	-0.01	0.00	0.04	*-0.69*	*-0.81*	0.01	0.22	0.05	0.03	-0.01	0.00
HI	0.00	0.00	0.00	0.00	0.02	*-0.60*	0.27	0.00	0.42	0.06	-0.06	0.00	0.00
RA	-0.05	-0.05	-0.04	-0.04	-0.10	*-0.25*	*-0.24*	-0.13	-0.12	-0.03	-0.09	-0.05	-0.04
RE	-0.04	-0.03	-0.04	-0.04	-0.06	*-0.91*	*-0.44*	-0.69	-0.03	-0.02	0.02	-0.03	-0.04
AVG	-0.01	-0.01	-0.02	-0.01	0.01	*-0.44*	*-0.48*	-0.12	0.11	0.06	0.01	-0.02	-0.02

Table S6. a) Correlations of TASMIN statistics with elevation – observations and RCM ensemble average; b) Difference between RCM-simulated and observed correlations strengths (individual RCMs and ensemble average); values in italics indicate simulated correlation of opposite sign than observed.

a)	Mean	Mean MAM	Mean JJA	Mean SON	Mean DJF	Sd MAM	Sd JJA	Sd SON	Sd DJF	Min	Q10 DJF	Q90 JJA	Max
OBS	**-0.95**	**-0.95**	**-0.95**	**-0.95**	**-0.89**	**0.39**	**0.39**	**-0.51**	**0.31**	**-0.63**	**-0.79**	**-0.95**	**-0.94**
AVG	-0.96	-0.97	-0.97	-0.96	-0.88	0.49	*-0.03*	-0.12	0.76	-0.87	-0.87	-0.96	-0.94
b)													
AL	0.03	0.04	0.03	0.01	0.03	-0.23	*-1.10*	0.24	0.60	0.32	0.13	0.02	0.02
CC	0.03	0.04	0.03	0.03	0.04	0.05	-0.02	0.10	0.50	0.27	0.13	0.01	-0.01
CO	0.02	0.03	0.01	0.02	0.06	0.36	-0.02	-0.24	0.50	0.32	0.15	-0.01	-0.03
HA	0.03	0.04	0.02	0.02	0.06	0.47	*-0.75*	*-1.31*	0.56	0.27	0.13	0.02	0.00
HI	0.02	0.03	0.03	0.02	-0.03	0.34	-0.31	-0.18	0.27	0.24	0.07	0.03	0.04
RA	-0.05	-0.05	-0.02	-0.04	-0.11	-0.22	*-0.43*	*-0.76*	0.36	0.16	-0.01	-0.03	-0.03
RE	0.01	0.03	0.03	0.00	-0.07	-0.09	-0.34	*-0.56*	0.37	0.10	-0.01	0.02	0.01
AVG	0.01	0.02	0.02	0.01	0.00	0.10	*-0.42*	-0.39	0.45	0.24	0.08	0.01	0.00

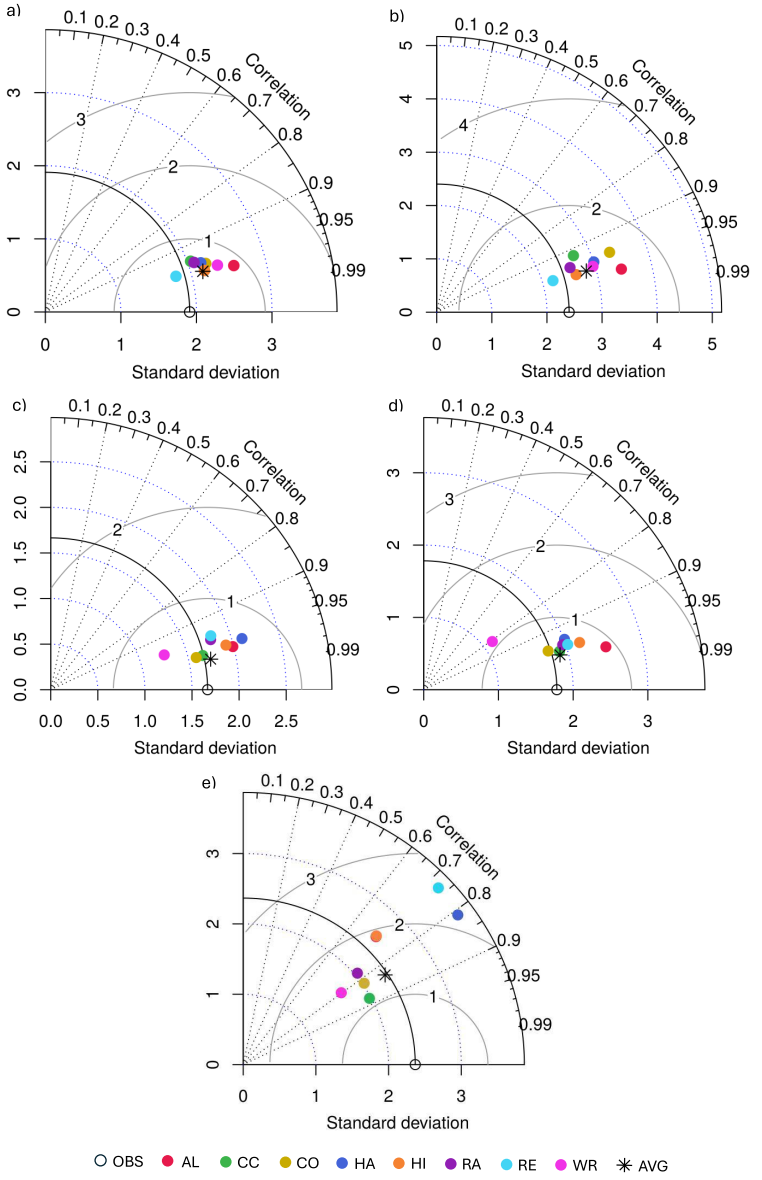


Fig. S3. Taylor diagram of observed and RCM-simulated 1989–2005 averaged a) TASMAX *Mean*, b) TASMAX *Q90JJA*, c) TASMIN *Mean*, d) TASMIN *Q90JJA* and e) TASMIN *Min* fields.