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China

In this section explore the latest projections about climate change

What is China's climate like?

- China covers a broad latitudinal band from 20° to 54° N with a diverse range of geographical characteristics which contribute to climate
- Monsoonal winds dominate the climate. Northerly winds bring cold dry conditions in the winter, and southerly winds bring warm wet conditions in the summer
- Wet season occurs between May and September. Largest rainfall is received at coastal areas (over 2000mm), lowest rainfall in the continental North-west (less than 50mm per year)
- Northern China experiences a cold desert climate and rainfall is low throughout the year
- Southern China experiences typhoons in summer with temperature above 20°C

Graph one: How did China's temperature change between 1960 and 2009?

- The black line shows the actual temperature anomaly for each year from 1960 to 2000. This is the difference in temperature between the year's recorded temperature and the average of all years between 1970 and 1999. If the anomaly is positive, that year was warmer than the 1970-1999 average. If it is negative, that year was colder than the 1970-1999 average
- The brown line shows past temperature anomalies as produced by a computer model with the brown shading showing the range of temperatures produced by the model
- Mean annual temperature has increased by 0.8°C since 1960, average rate of 0.18°C per decade. Rate of 0.36°C per decade
- Temperature increases are particularly rapid in the Northern regions in the Winter (DJF)
- The green, blue and red lines show projected future temperatures from 2006 to 2100, according to three different emission scenarios – green (low), blue (medium) and red (high). The shading around each line shows the range of temperature that might be possible with each emission scenario
- The coloured bars summarize the range of temperatures for each emissions scenario
- All scenarios show future temperatures will be warmer
- Mean annual temperature is projected to increase by 1.3°C to 3.5°C by the 2060s and 1.7°C to 5.5°C by the 2090s
- Projected rate of warming is greatest in winter (DJF) with increases of 2.0°C to 6.4°C projected by the 2090s
- Projected increases are most rapid in northern and western regions of China, with projected increases in annual mean temperature of around 2°-6°C in the northern regions and the Tibet Plateau (regions A, B, C and F), but more moderate increases of around 1.5°-5°C in regions D and E

Graphs two to four: How will China's annual temperature change during the 2030s, 60s and 90s?

- These maps show projected temperature change during the 2030s, 60s and 90s in different areas of China (according to a high emissions scenario)
- All values are anomalies – compared to average temperatures from 1970 to 1999
- Areas shaded deep red will be 7°C hotter than average temperatures from 1970 to 1999. Whereas, areas shaded green will be effectively the same

- The tiny numbers in the centre of each grid box is the average expected temperature; numbers in the upper and lower corners give the maximum and minimum temperature anomalies
- Mean annual temperature is projected to increase by 1.3°C to 3.5°C by the 2060s and 1.7°C to 5.5°C by the 2090s. the range of projections by the 2090s under any one emissions scenario is around 2°C
- Projected rate of warming is greatest in winter (DJF) with increases of 2.0°C to 6.4°C projected by the 2090s
- Projected increases are most rapid in northern and western regions of China,with projected increases in annual mean temperature of around 2°-6°C in the northern regions (regions A, B, C and F), but more moderate increases of around 1.5°-5°C in regions D and E

Graphs five to seven: How will China's temperature change seasonally? – December, January, February

- These 3 maps show projected December, January and February (DJF) temperatures in the 2030s, 60s and 90s (according to a high carbon dioxide emissions scenario, A2)
- All values are anomalies– the difference in temperature to the average of 1970 to 1999 temperatures
- Areas shaded red will be 6-7°C hotter than average temperatures from 1970 to 1999, whereas areas shaded green will be the same as the 1970-1999 average
- The number in the centre of each grid box is the average projected temperature; numbers in the upper and lower corners give the highest and lowest possible DJF mean temperature
- From 1960 to 2060 the temperature in DJF is expected to rise approximately 6°C

Graphs eight to 10: How will China's temperature change seasonally? – March, April, May

- These 3 maps show projected March, April and May (MAM) temperatures in the 2030s, 60s and 90s (according to a high carbon dioxide emission scenario, A2)
- All values are anomalies– the difference in temperature to the average of 1970 to 1999 temperatures
- Areas shaded red will be 6-7°C hotter than average temperatures from 1970 to 1999, whereas areas shaded green will be about the same as the 1970-1999 average
- The number in the centre of each grid box is the average MAM temperature anomaly we expect having had high carbon dioxide emissions; the smaller numbers in the upper and lower corners give the range of average temperature anomalies that might occur
- From 1960 to 2060 the temperature in MAM is expected to rise approximately 5°

Graphs 11 to 13: How will China's temperature change seasonally? – June, July, August

- These 3 maps show projected June, July and August (JJA) temperatures in the 2030s, 60s and 90s (according to a high carbon dioxide emissions scenario, A2)
- All values are anomalies– the difference in temperature to the average of 1970 to 1999 temperatures
- Areas shaded red will be 6-7°C hotter than average temperatures from 1970 to 1999, whereas areas shaded green will be about the same as the 1970-1999 average
- The number in the centre of each grid box is the average JJA temperature anomaly we expect having had high carbon dioxide emissions; the smaller numbers in the upper and lower corners give the range of average temperature anomalies that might occur
- From 1960 to 2060 the temperature in JJA is expected to rise approximately 5°C

Graphs 14 to 16: How will China's temperature change seasonally? – September, October, November

- These 3 maps show projected September, October and November (SON) temperatures in the 2030s, 60s and 90s (according to a high carbon dioxide emission scenario, A2)

Climate 4 Classrooms: National Futures

- All values are anomalies – the difference in temperature to the average of 1970 to 1999 temperatures
- Areas shaded red will be 6-7°C hotter than average temperatures from 1970 to 1999, whereas areas shaded green will be about the same as the 1970-1999 average
- The number in the centre of each grid box is the average SON temperature anomaly we expect having had high carbon dioxide emissions; the smaller numbers in the upper and lower corners give the range of average temperature anomalies that might occur
- From 1960 to 2060 the temperature in SON is expected to rise approximately 5°C

Graphs 17 to 18: How will China's frequency of hot days change?

- These two maps show the percentage of hot days expected during the 2060s and 2090s given high carbon dioxide emissions through the century (scenario A2)
- A hot day is defined by the temperature exceeded on 10% of days in 1970-1999. So, in 1970–1999, you would have expected 1 in 10 days to be hot. If the map shading indicates that more than 10% of days are hot, then there has been an increase in the number of hot days
- In areas shaded deep red, every day will be a hot day. Yellow areas will have 30% hot days
- The number in the centreof each grid box is the number of hot days we expect; the smaller numbers in the upper and lower corners give the range of numbers of hot days that might occur
- Projections indicate that 'hot' days will occur on 16%-25% of days by the 2060s, and 17%-34% of days by the 2090s

Graphs 19 to 20: How will China's frequency of hot nights change?

- These two maps show the percentage of hot nights expected during the 2060s and 2090s given high carbon dioxide emissions through the century (scenario A2)
- A hot night is defined by the temperature exceeded on 10% of nights in 1970-1999. So, in 1970 – 1999, you would have expected 1 in 10 nights to be hot. If the map shading indicates that more than 10% of nights are hot, then there has been an increase in the number of hot nights
- In areas shaded deep red, every night will be a hot night. Yellow areas will have 30% hot nights
- The number in the centre of each grid box is the number of hot nights we expect; the smaller numbers in the upper and lower corners give the range of numbers of hot nights that might occur
- Nights that are considered 'hot' for the annual climate of 1970-1999 are projected to occur on 16%-25% of nights by the 2060s and 17%-34% of nights by the 2090s

Graph 21: How will China's precipitation change?

- This graph shows the 'precipitation anomaly' – the difference in rain or snowfall to the 1970-1999 average. If the graph shows a positive number, then it is wetter than the 1970-1999 average. If the graph shows a negative number, then it is drier
- The black line shows the actual precipitation anomaly for each year from 1960 to 2006. This is the difference in rain/ snowfall between the year's recorded precipitation and the average of all years between 1970 and 1999
- The brown line shows past precipitation anomalies as produced by a computer model with the brown shading showing the range produced by the model
- The green, blue and red lines show projected future precipitation from 2006 to 2100, according to three different carbon dioxide emission scenarios – green (low), blue (medium) and red (high). The shading around each line shows the range of precipitation that might be possible with each emission scenario. Rainfall over China does not appear to show any consistent increase or decrease since the 1960s
- Significant trends are, however, evident in particular regions: North West China (region A) positive trends are observed in the dry season. South East China (region E) significant increasing trend of 5.6 mm per month (3.3%) per decade

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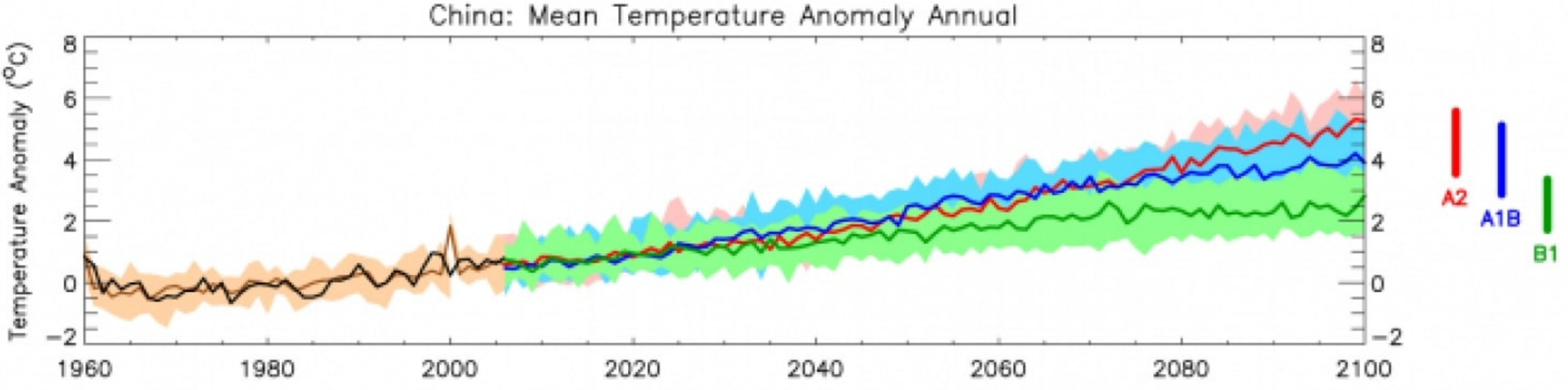
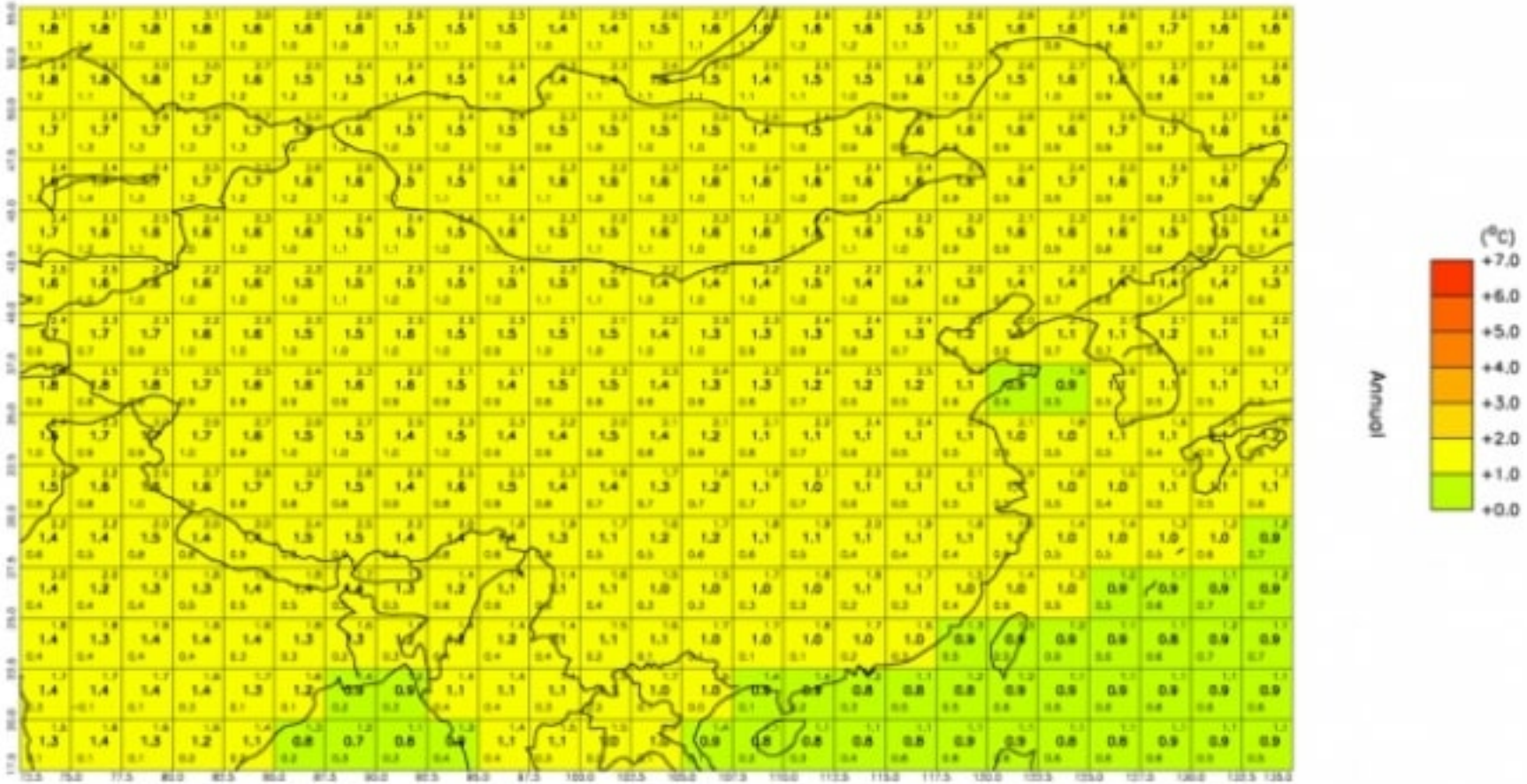
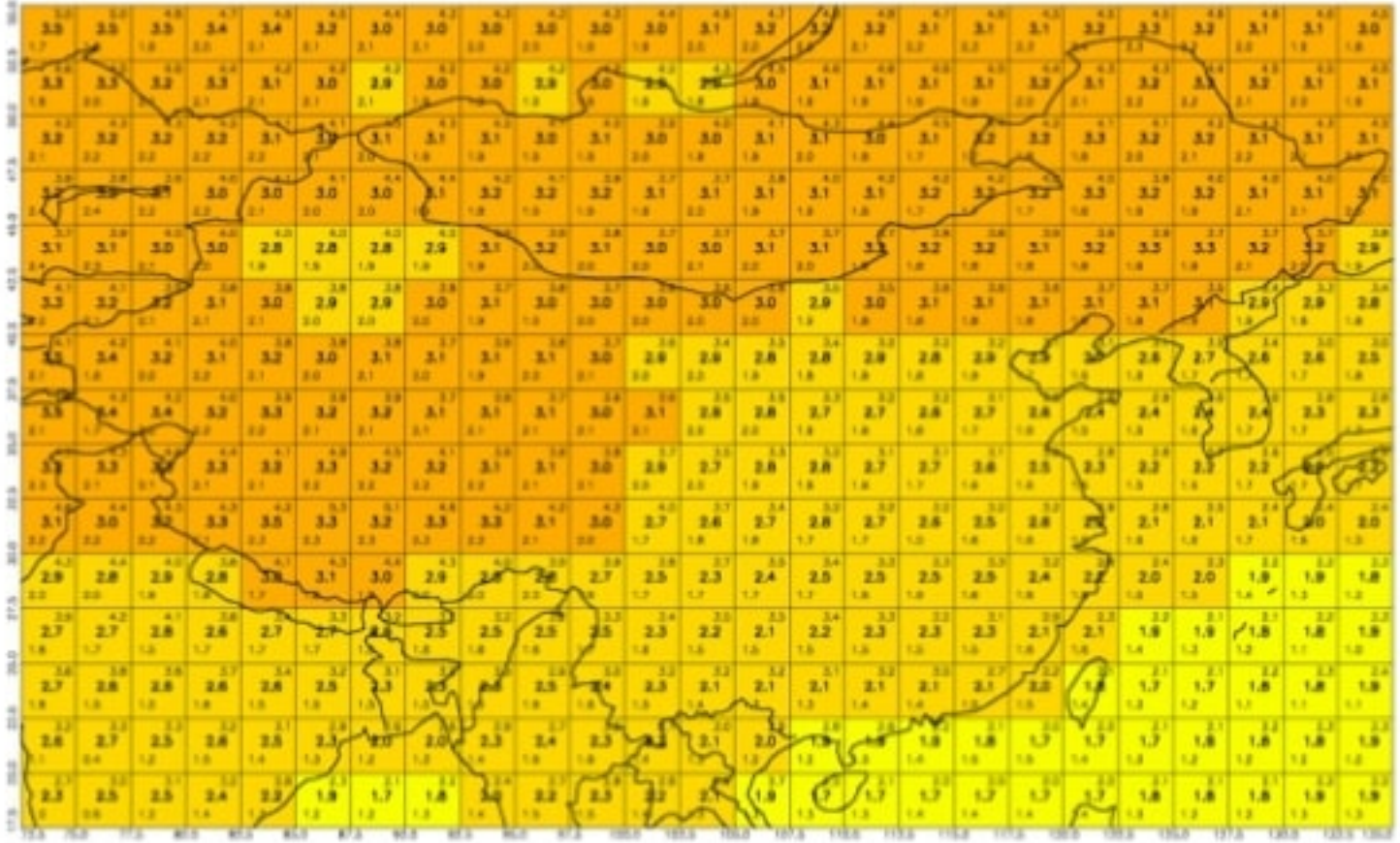
- North-east China (Region A) is projected to receive increased rainfall in the dry seasons, partially offset by decreases in wet season (JJA) rainfall
- North-west and North-central China (Regions B and F) are projected to receive increases in rainfall all year round
- Rainfall projections for the Tibetan Plateau region (Region C) are mixed, some large increases in wet-season rainfall over the southern areas near Nepal and Bhutan, but decreases in DJF
- Southern regions of China (Regions D and E) are projected to experience increases in wet-season rainfall, and decreases in dry-season rainfall


China: Mean Temperature Anomaly Annual
Temperature Anomaly (°C)
8
6
4
2
0
−2
1960
1980
2000
2020
2040
2060
2080
2100
A2
A1B
B1

2030s



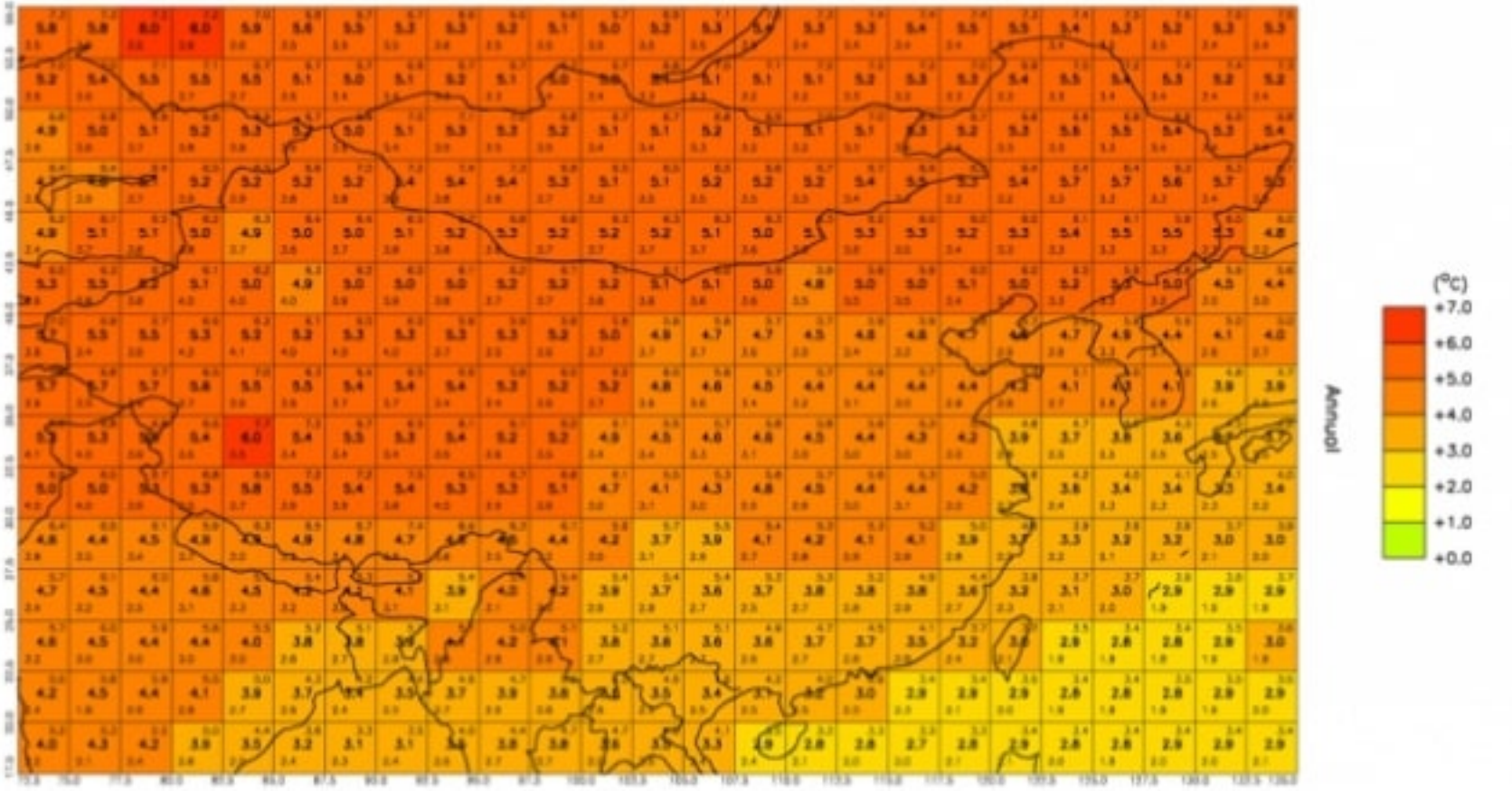
2060s



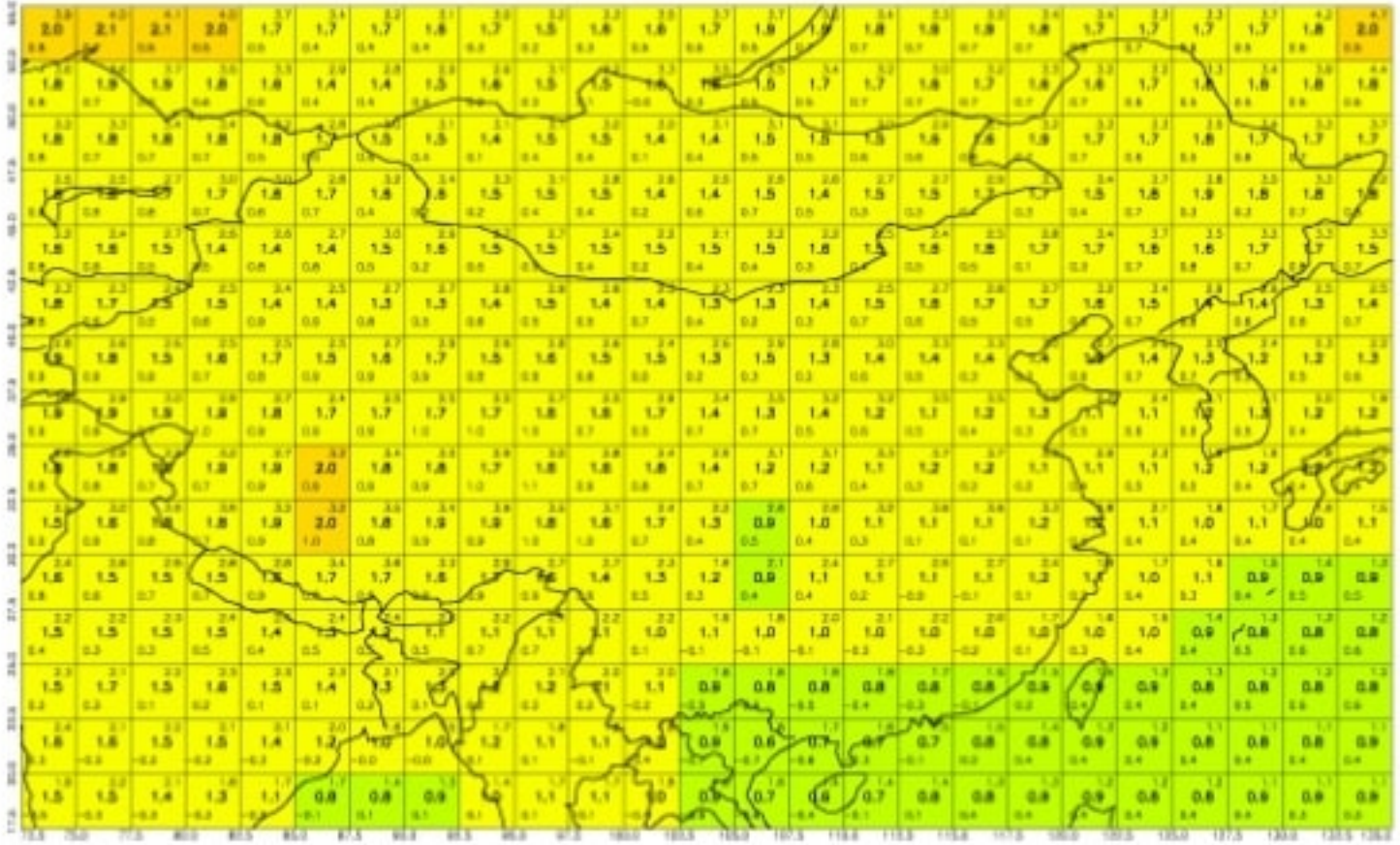
Annual

(°C)
+7.0
+6.0
+5.0
+4.0
+3.0
+2.0
+1.0
+0.0

2090s



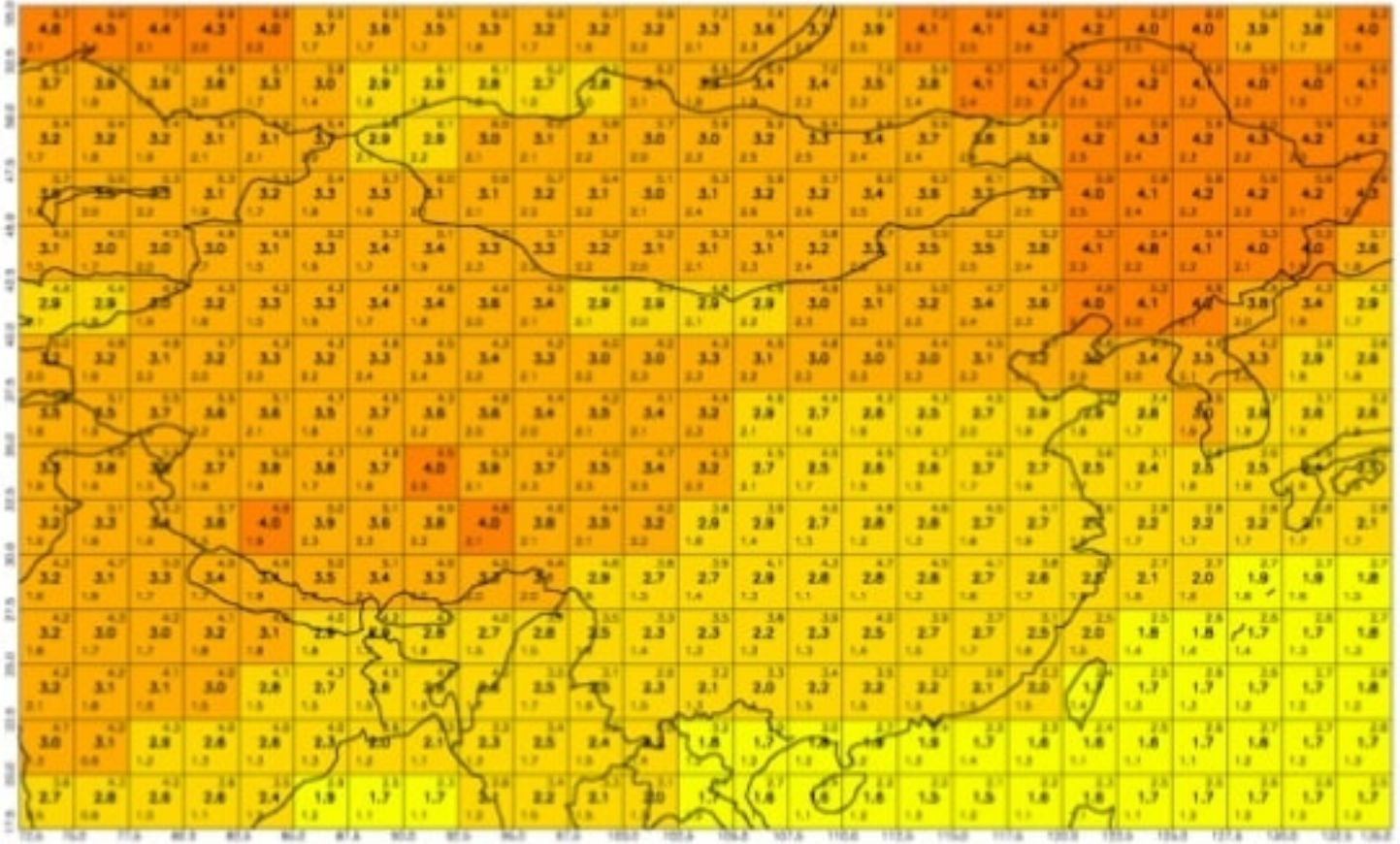
2030s



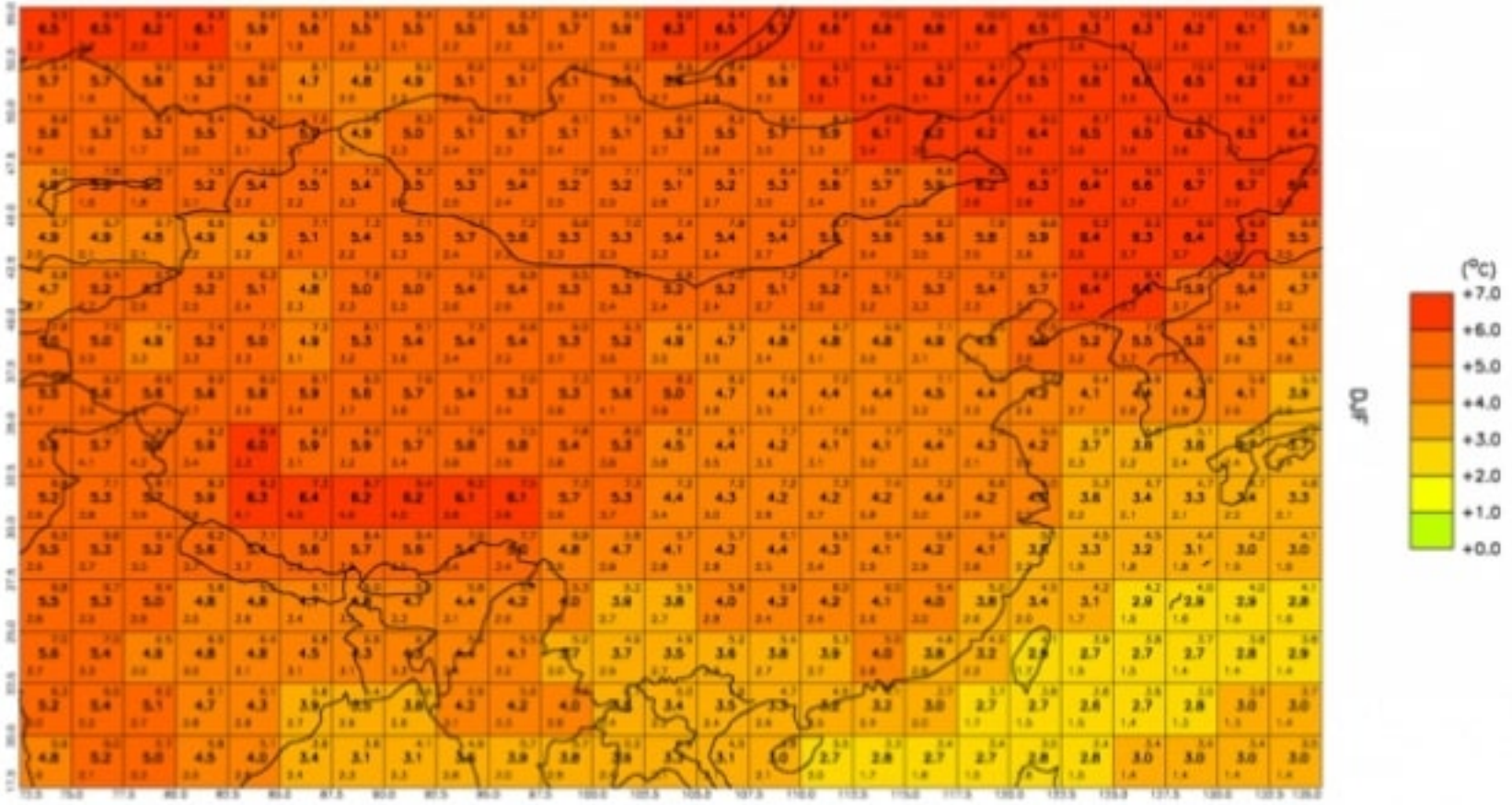
(°C)
+7.0
+6.0
+5.0
+4.0
+3.0
+2.0
+1.0
+0.0

DJF

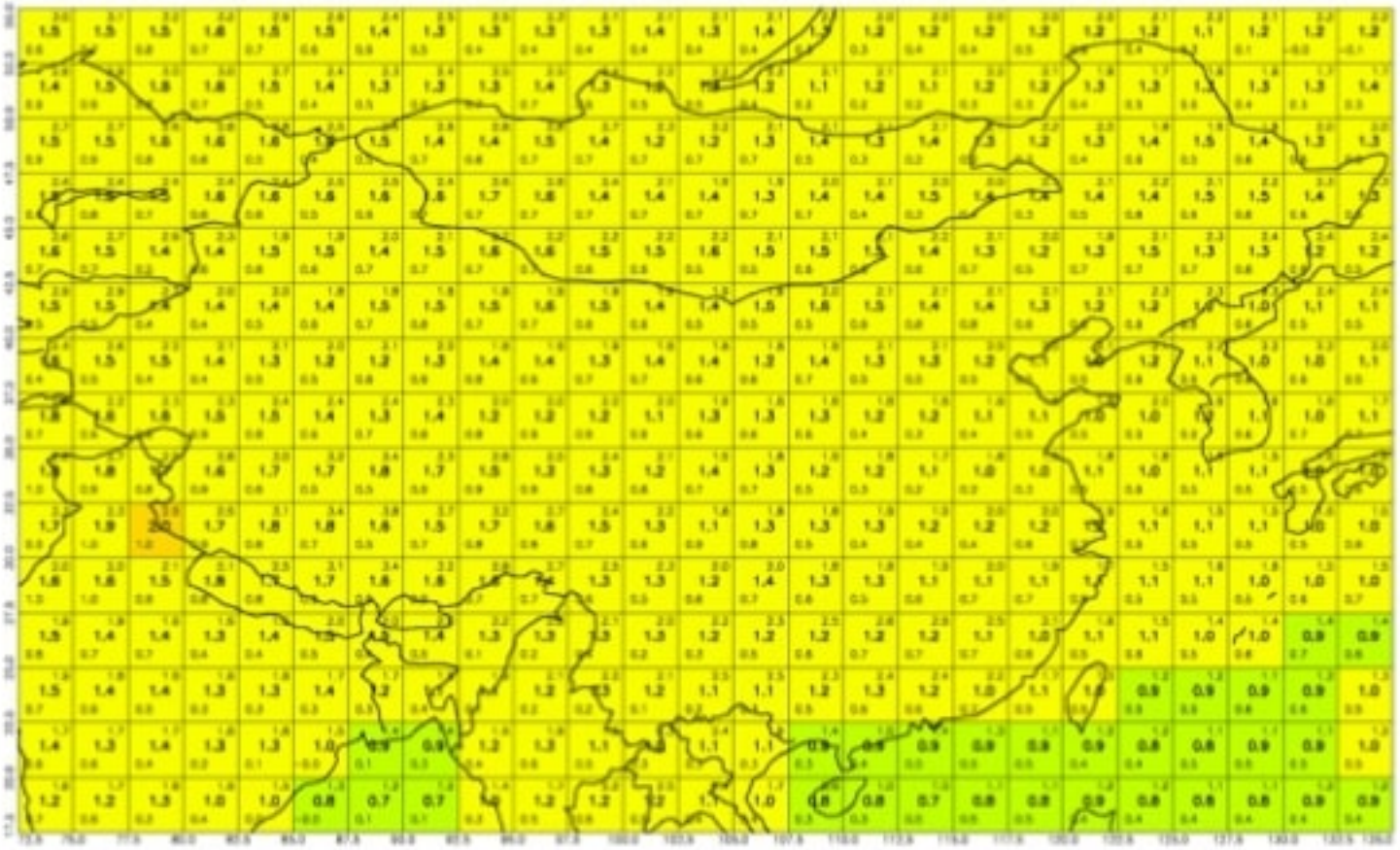
2060s



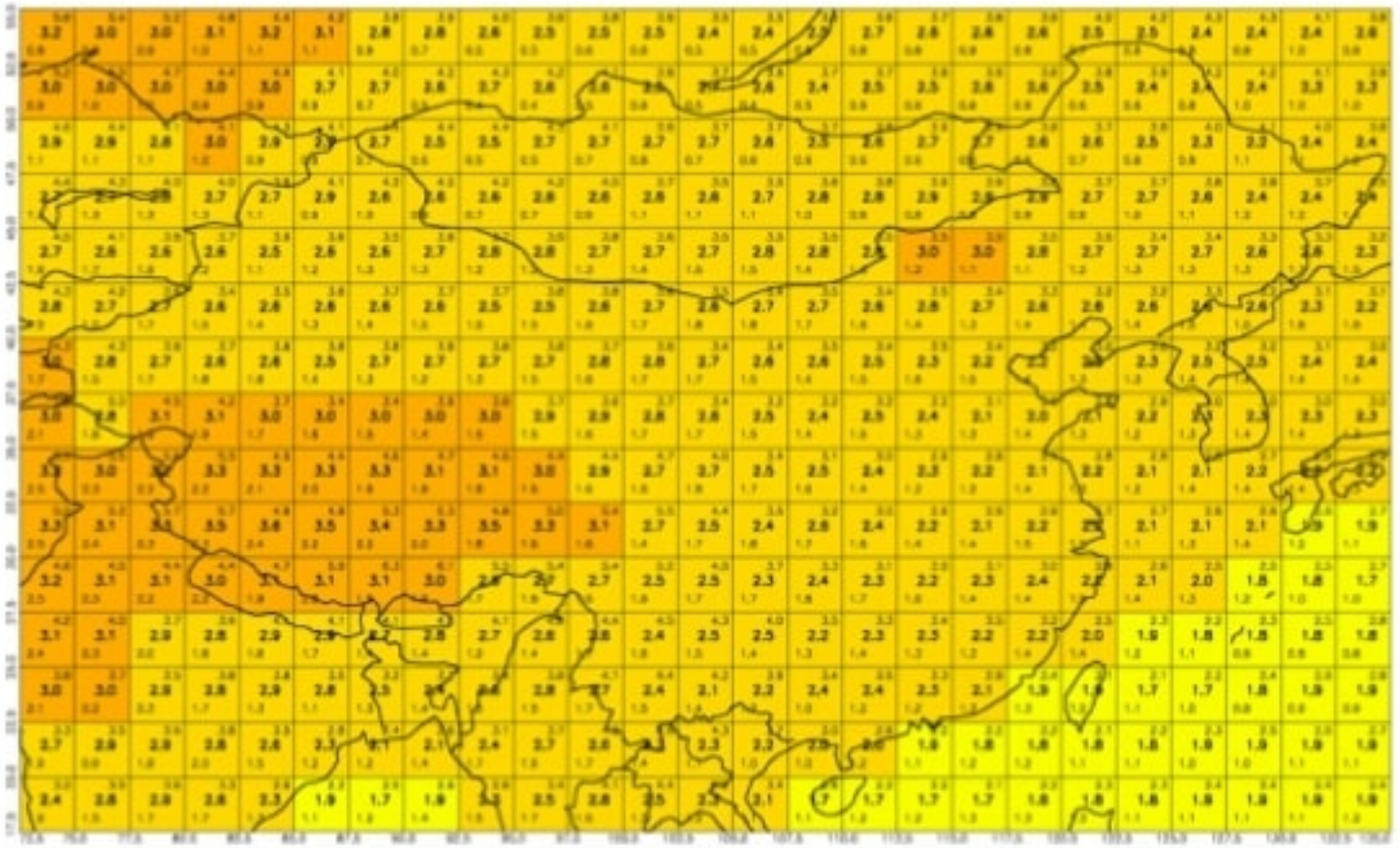
2090s



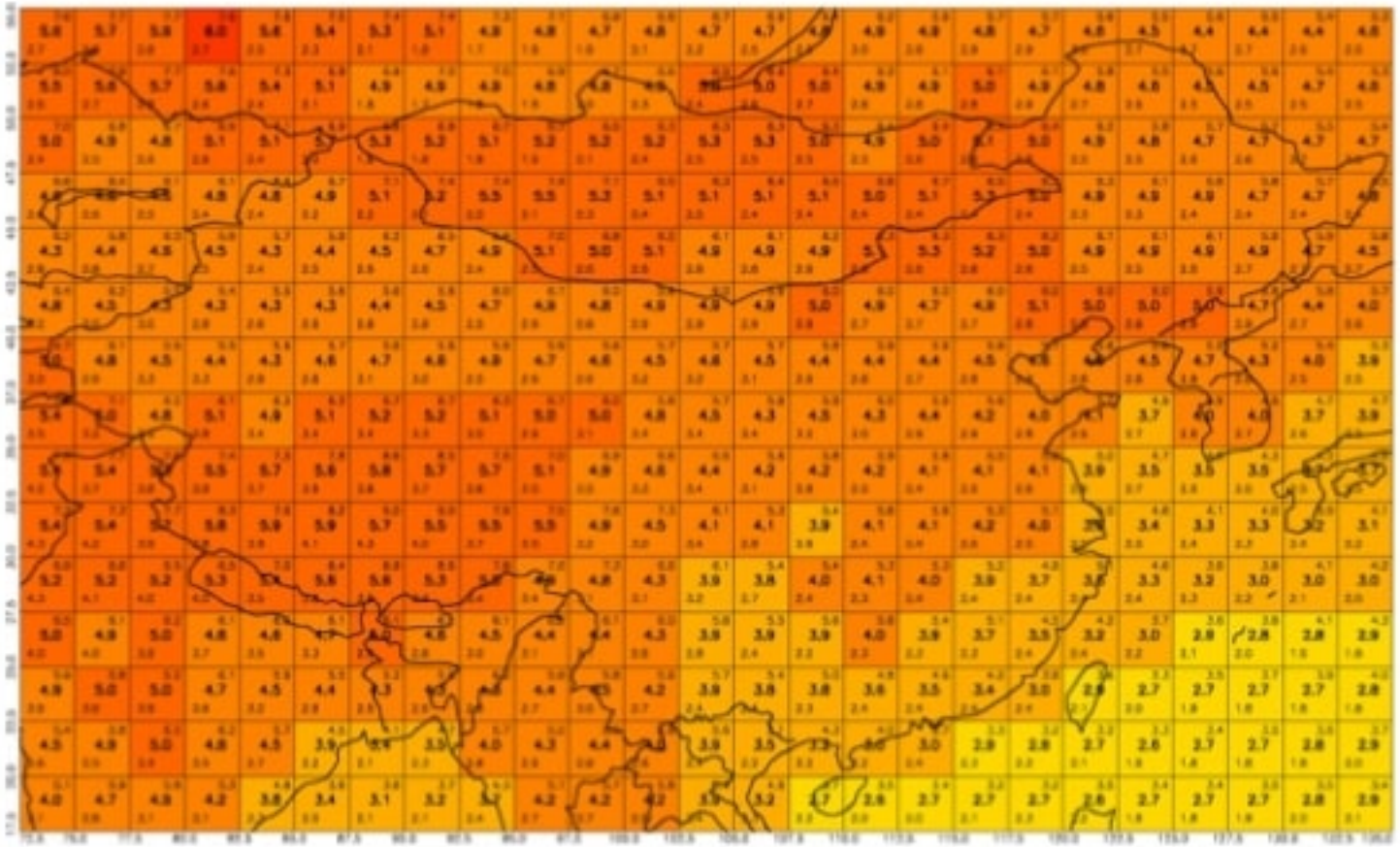
2030s



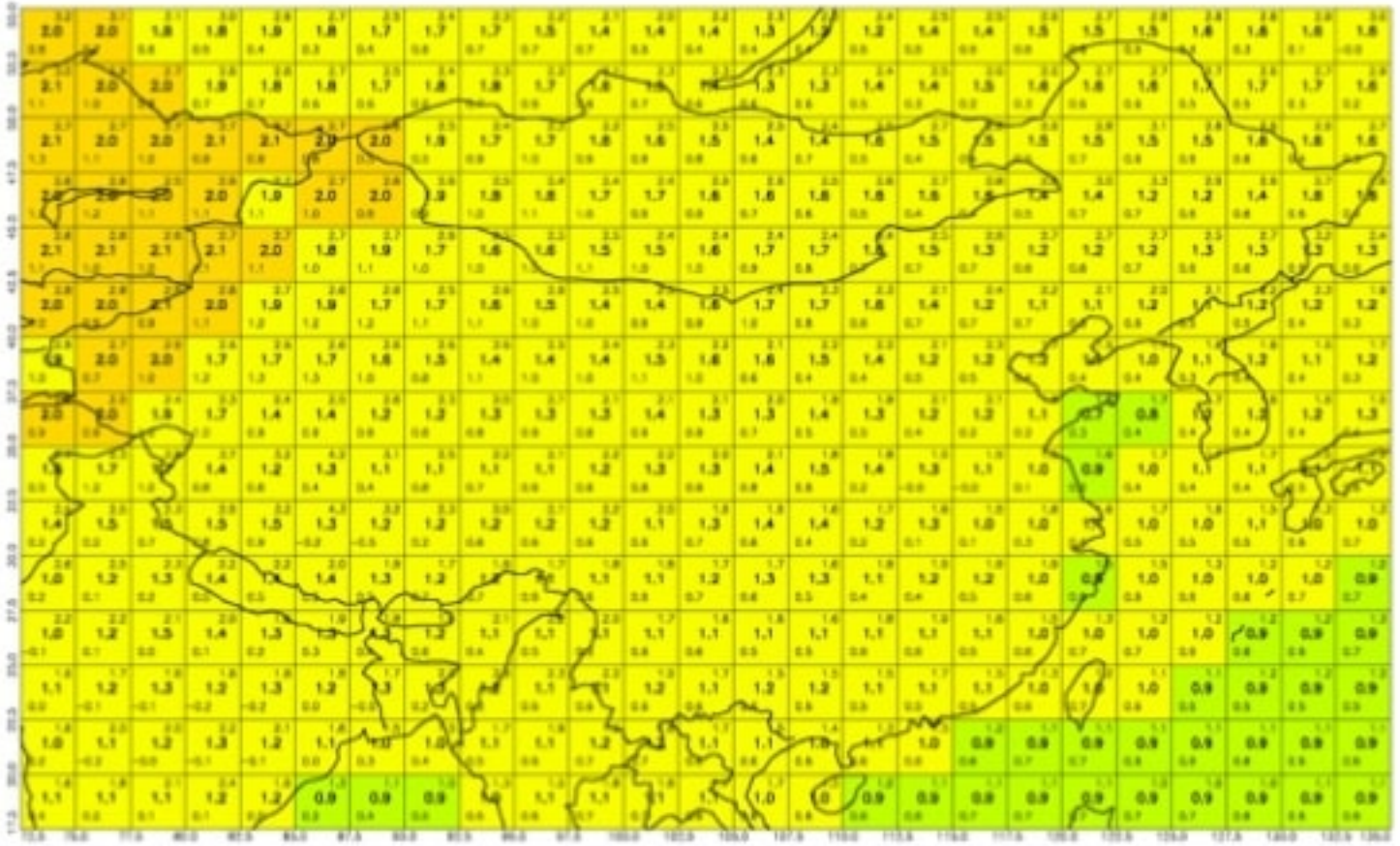
2060s



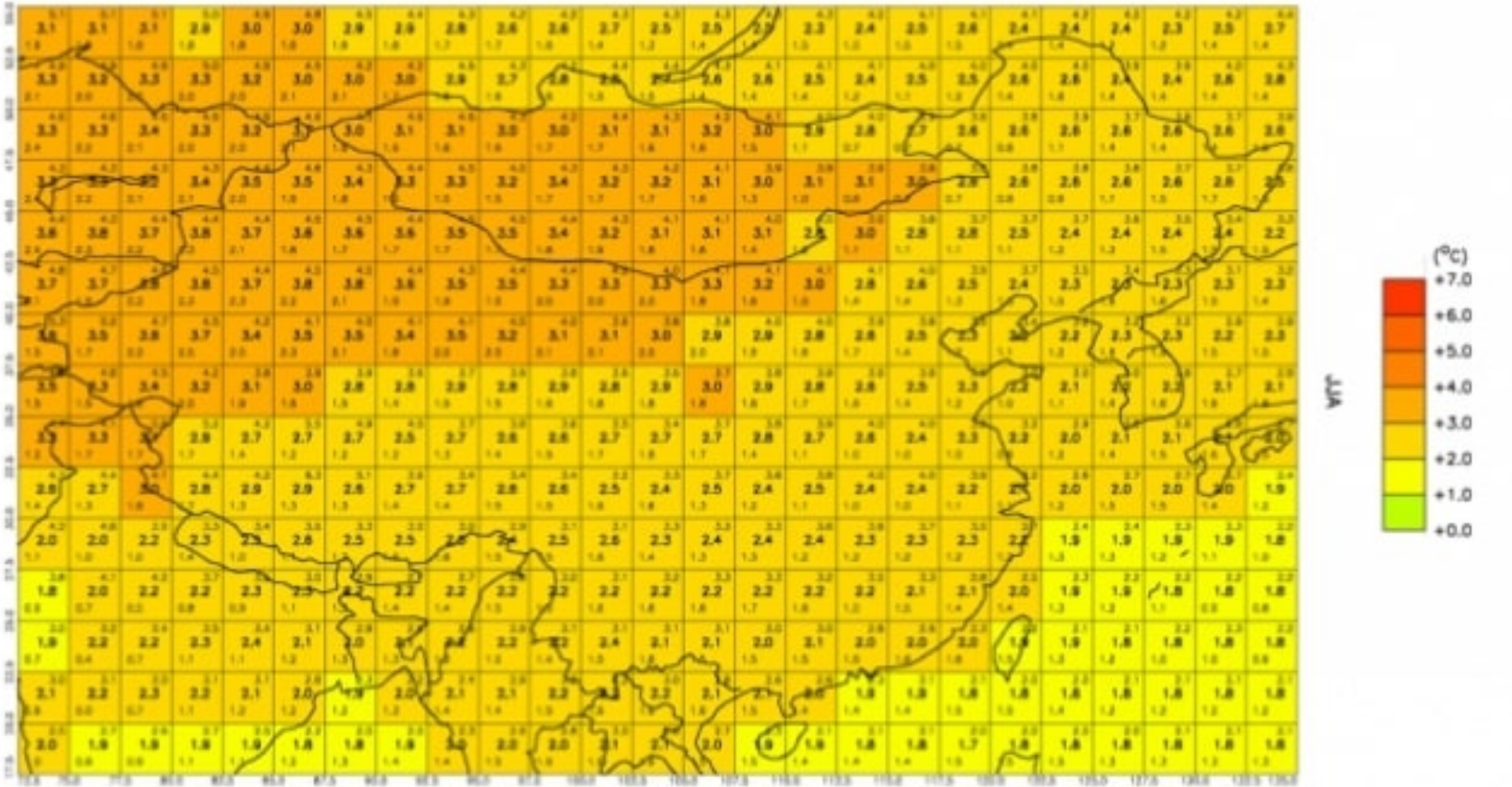
2090s



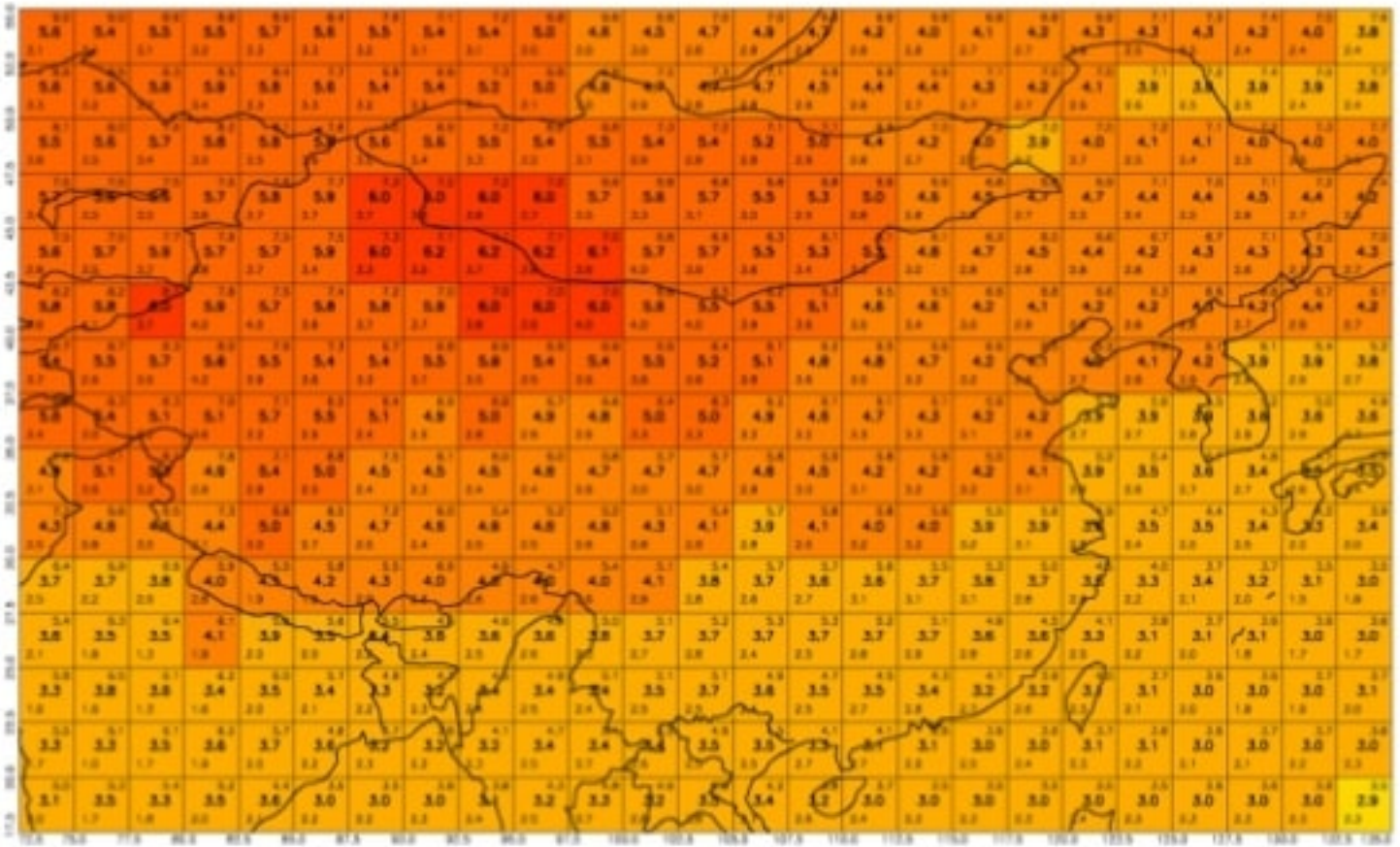
2030s



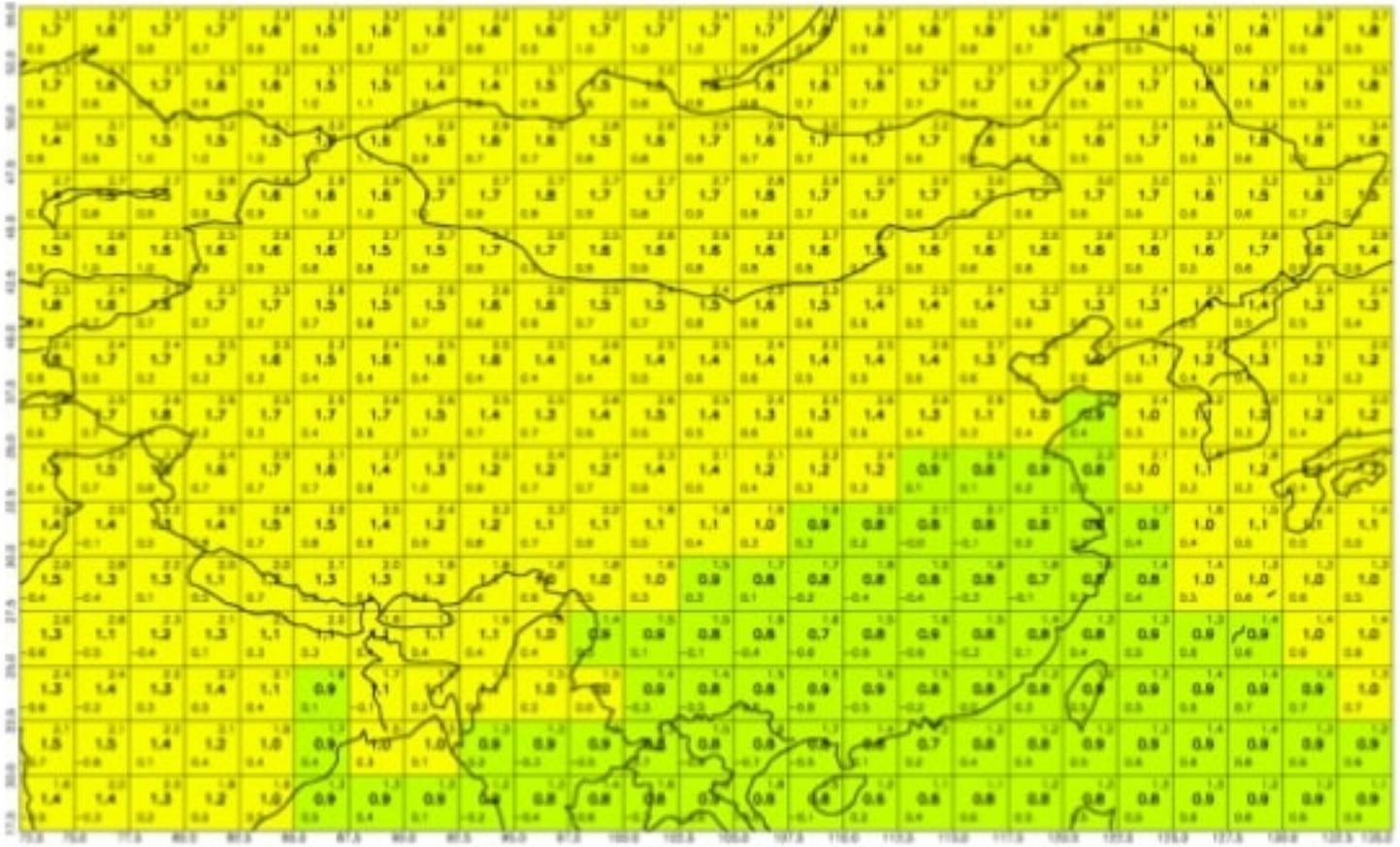
2060s



2090s



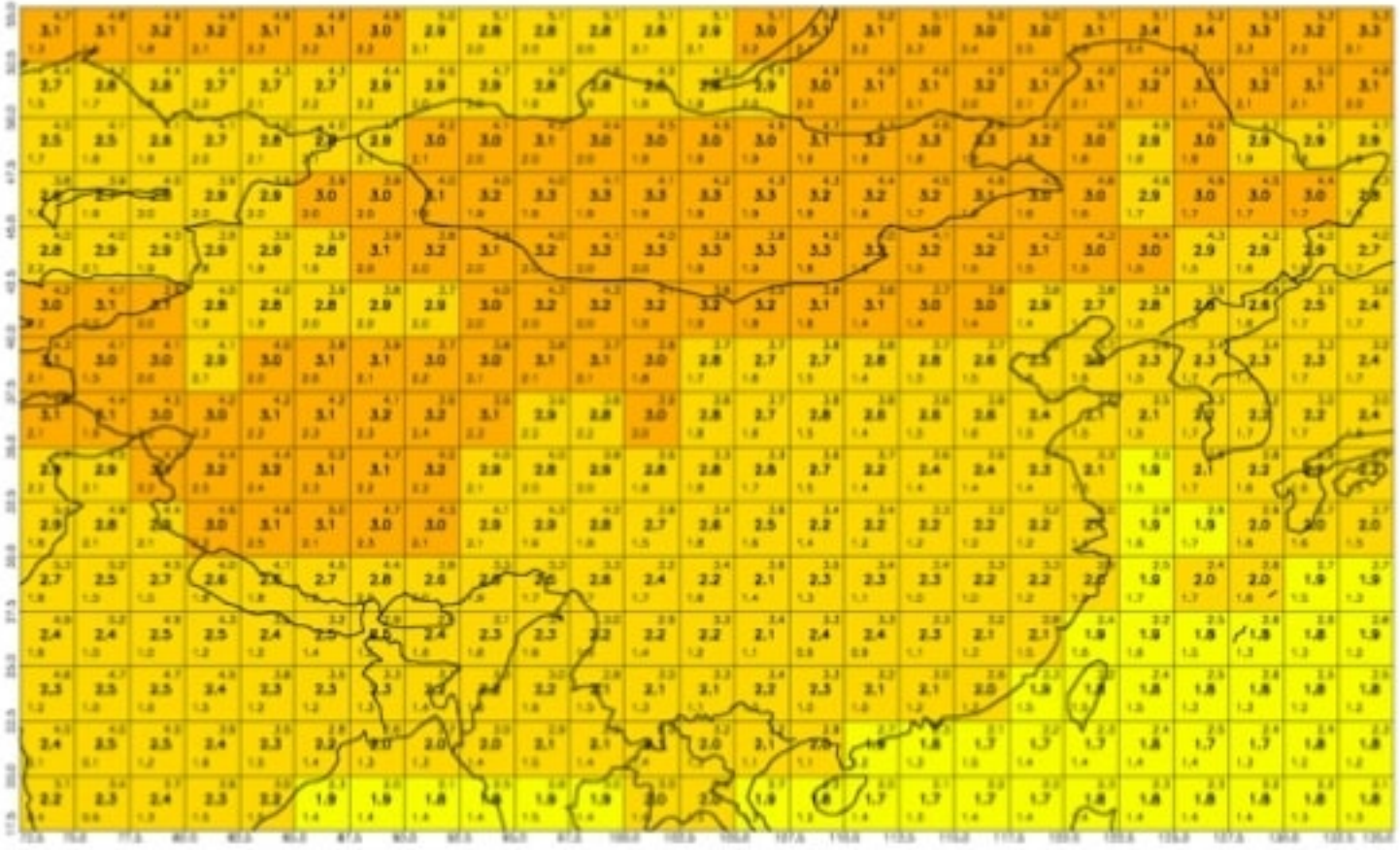
2030s



(°C)
+7.0
+6.0
+5.0
+4.0
+3.0
+2.0
+1.0
+0.0

NOS

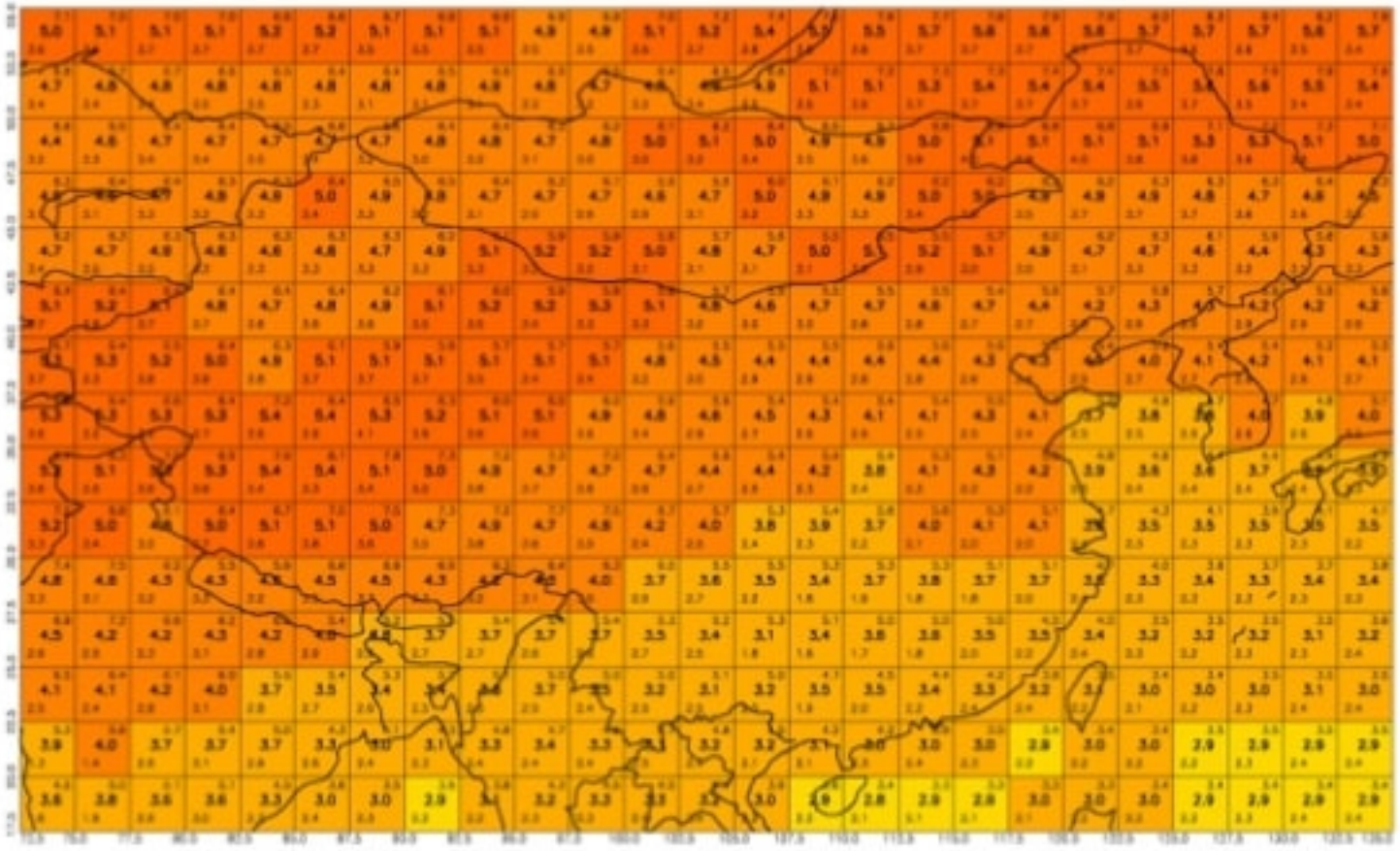
2060s



SON

(°C)
+7.0
+6.0
+5.0
+4.0
+3.0
+2.0
+1.0
+0.0

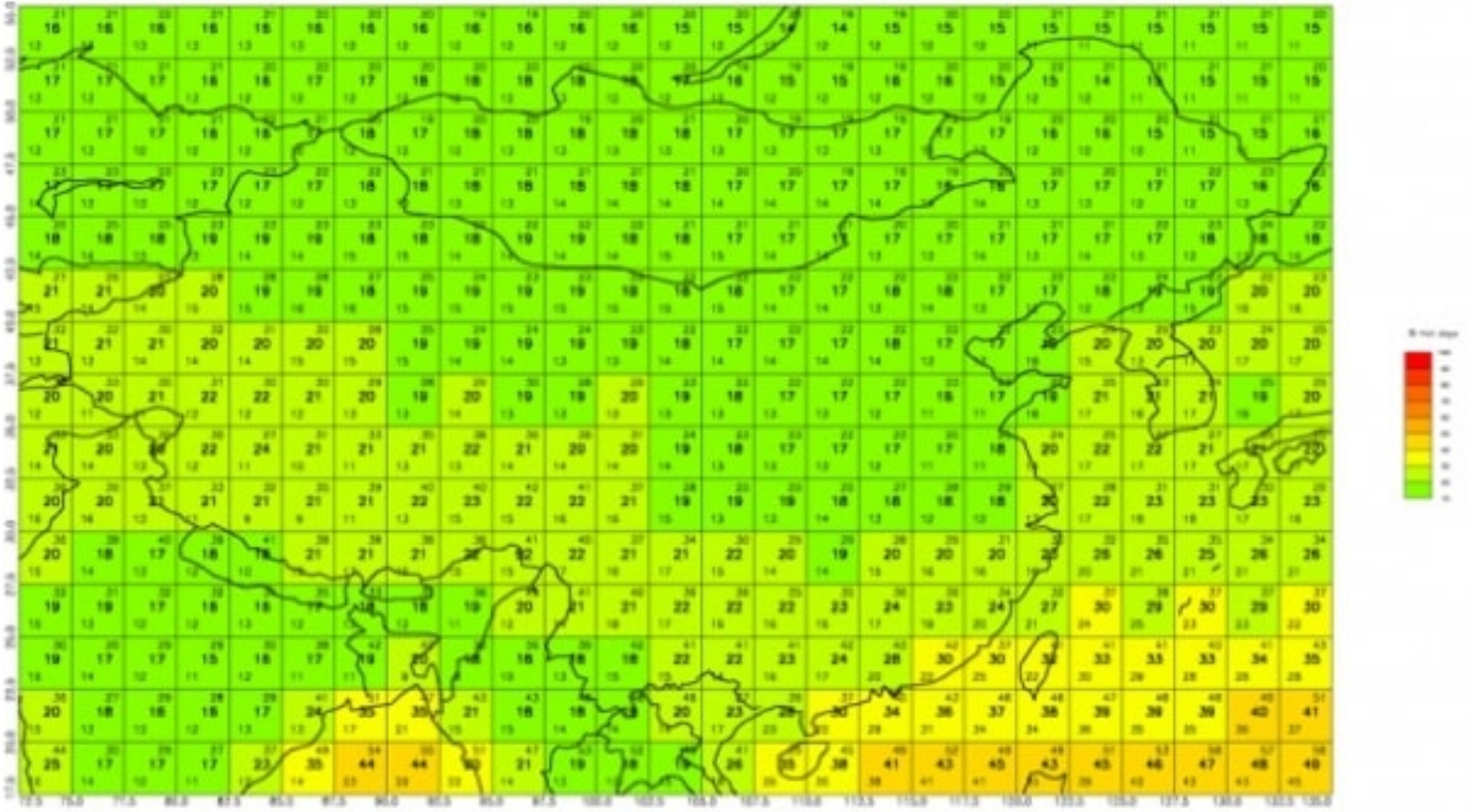
2090s



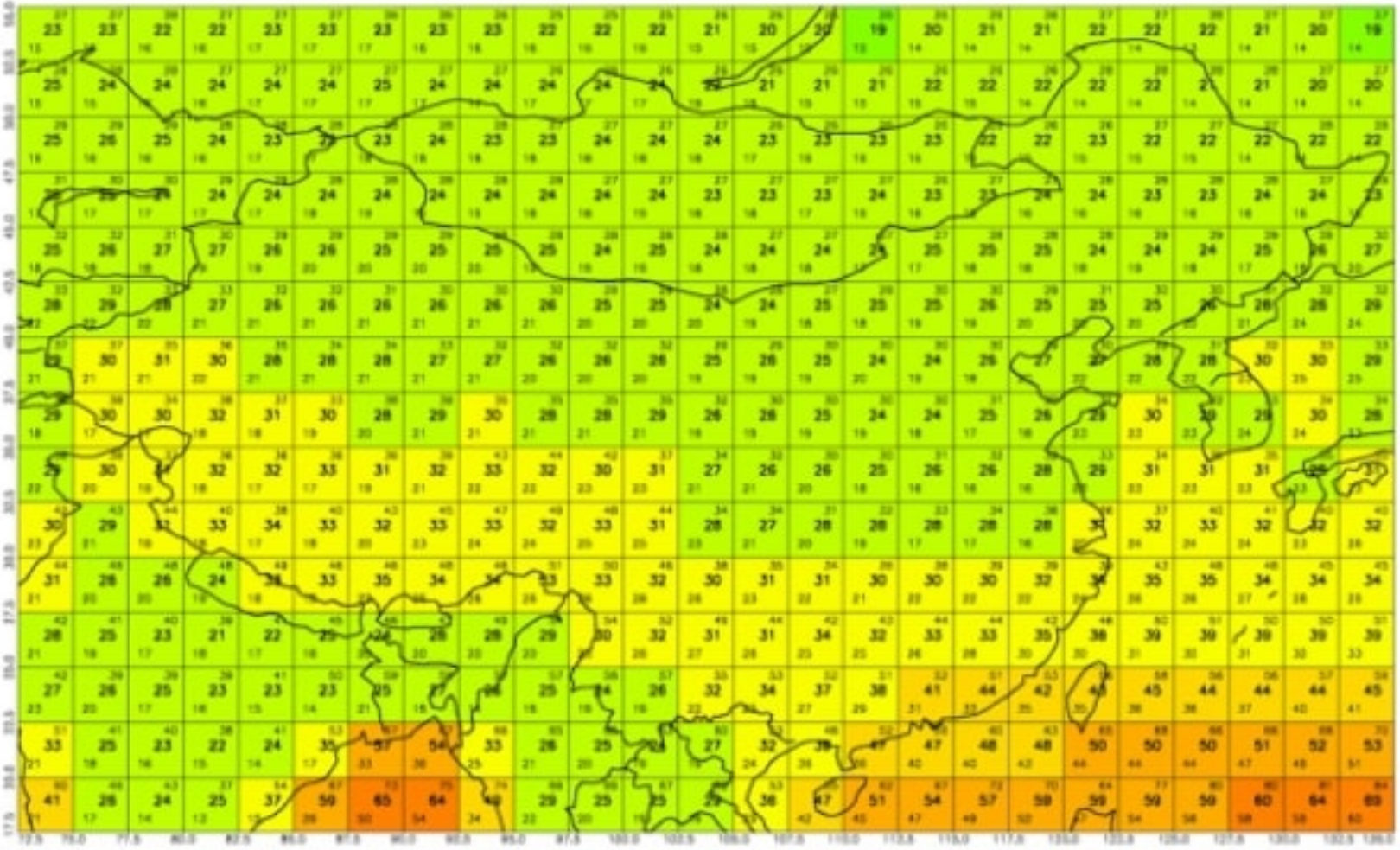
SON

(°C)
+7.0
+6.0
+5.0
+4.0
+3.0
+2.0
+1.0
+0.0

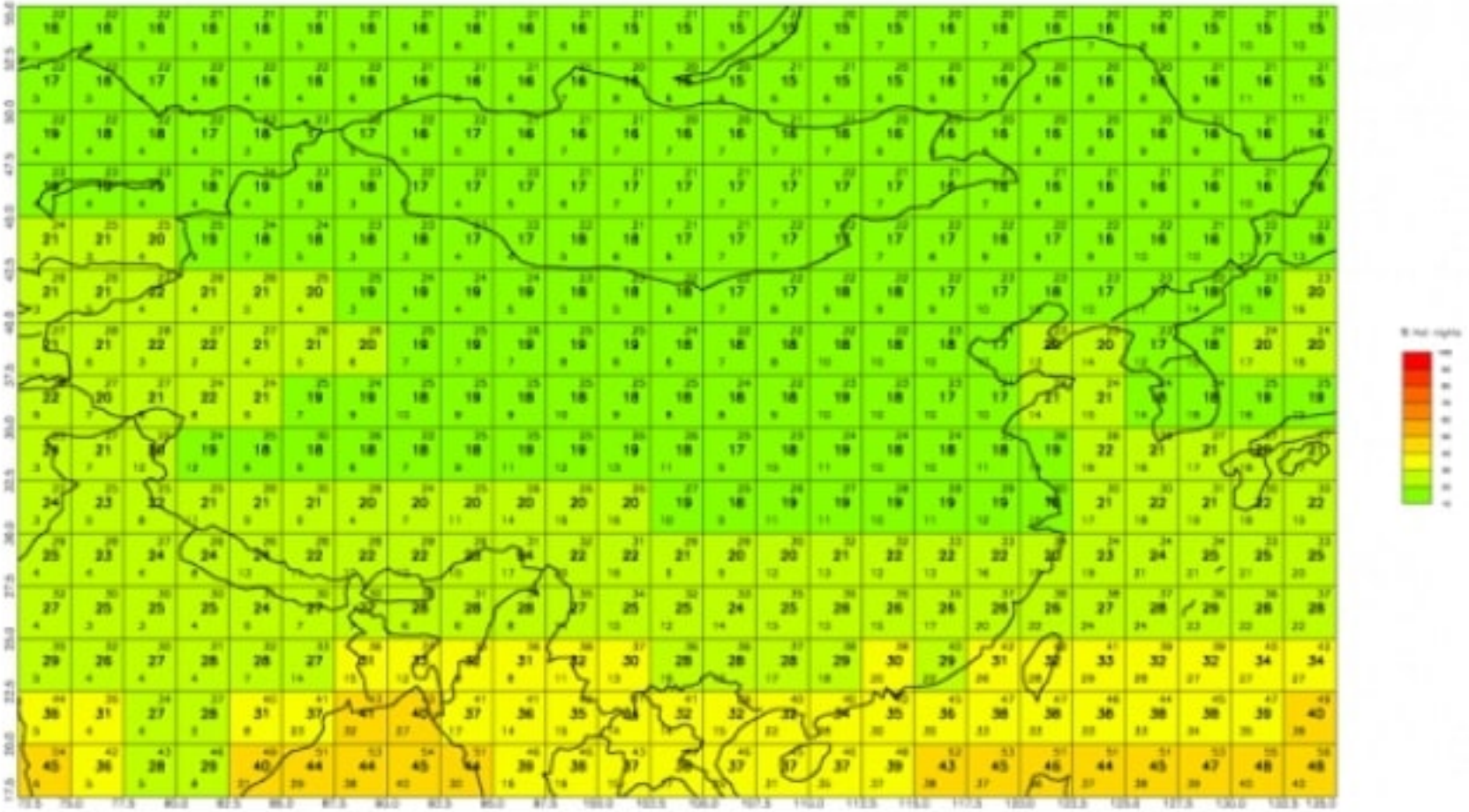
Annual 2060s



Annual 2090s



Annual 2060s



Annual 2090s