Supplementary Material

Figure S1) Data availability: precipitation stations in CNP

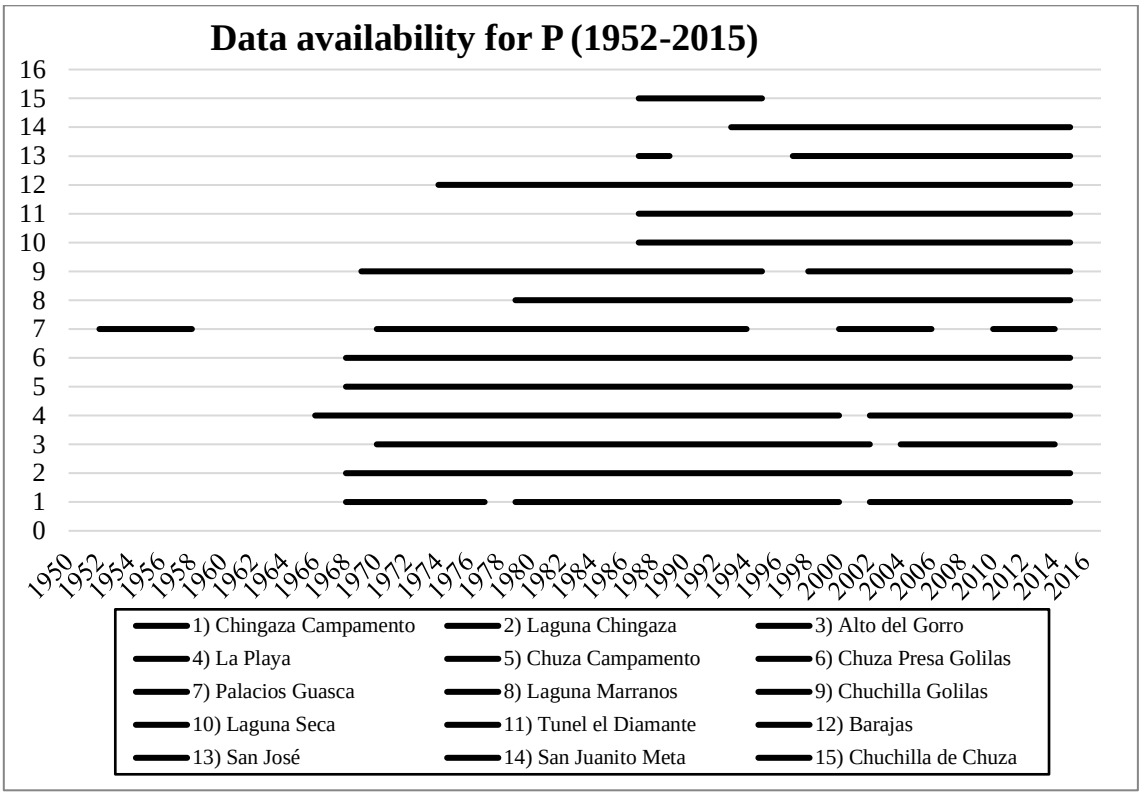

Figure S1. Data availability for the 15 precipitation (P) stations in CNP for the period 1952-2015.

Figure S2) Average annual temperature: Chingaza Campamento

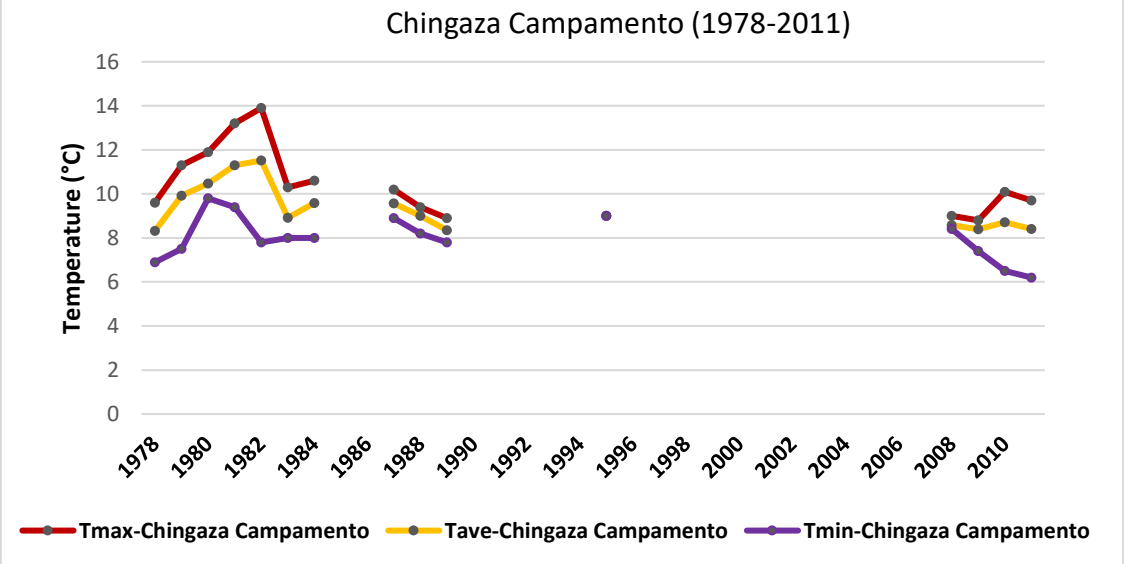

Figure S2. The average (1978-2011) annual (Tave), minimum (Tmin) and maximum (Tmax) temperature (°C) for Chingaza Campamento. The yellow colour represents Tmin, orange is Tave and the red is Tmax.

Figure S3) Average annual temperature: Chuza Presa Golilas

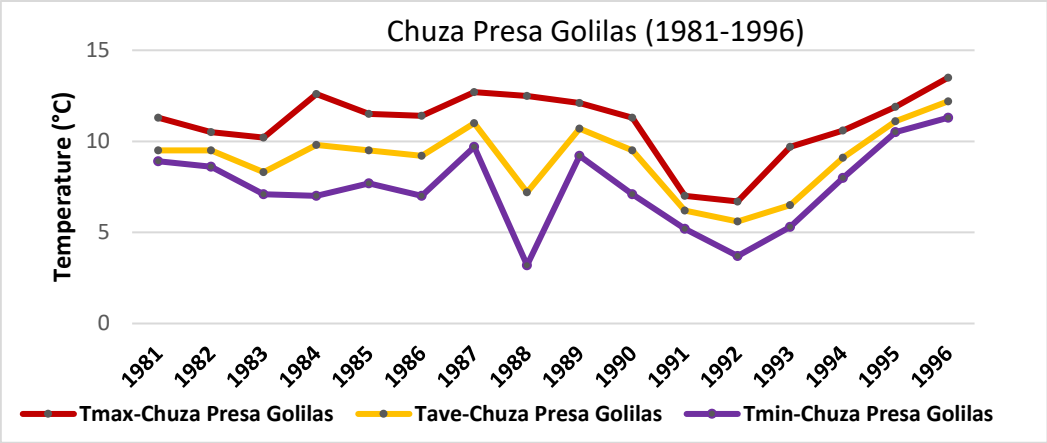

Figure S3. The average (1981-1996) annual (Tave), minimum (Tmin) and maximum (Tmax) temperature (°C) for Chuza Presa Golilas. The yellow colour represents Tmin, orange is Tave and the red is Tmax.

Figure S4) Average monthly temperatures: Chingaza Campamento and Chuza Presa Golilas

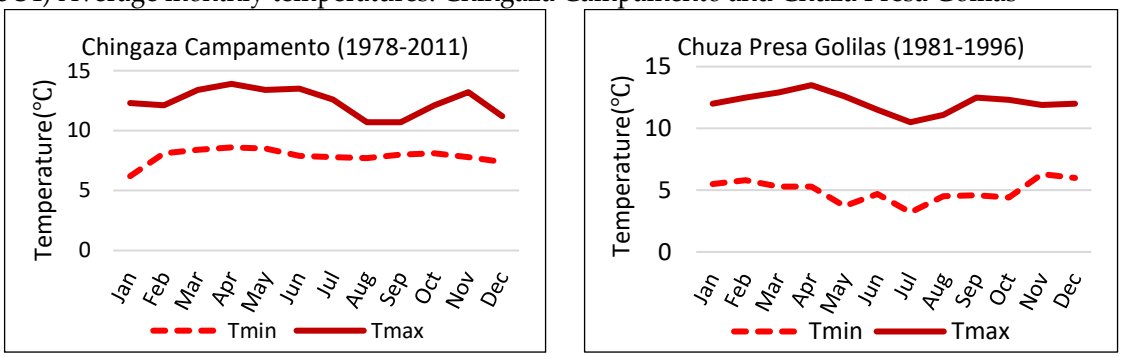

Figure 4. The average long-term monthly temperature (°C) for the stations Chingaza Campamento (left) and Chuza Presa Golilas (right). Note that the stations cover different periods, 1978-2011 for Chingaza Campamento and 1981-1996 for Chuza Presa Golilas.

Figure S5) Average annual precipitation (1968-2015): Chingaza Campamento and Laguna Chingaza

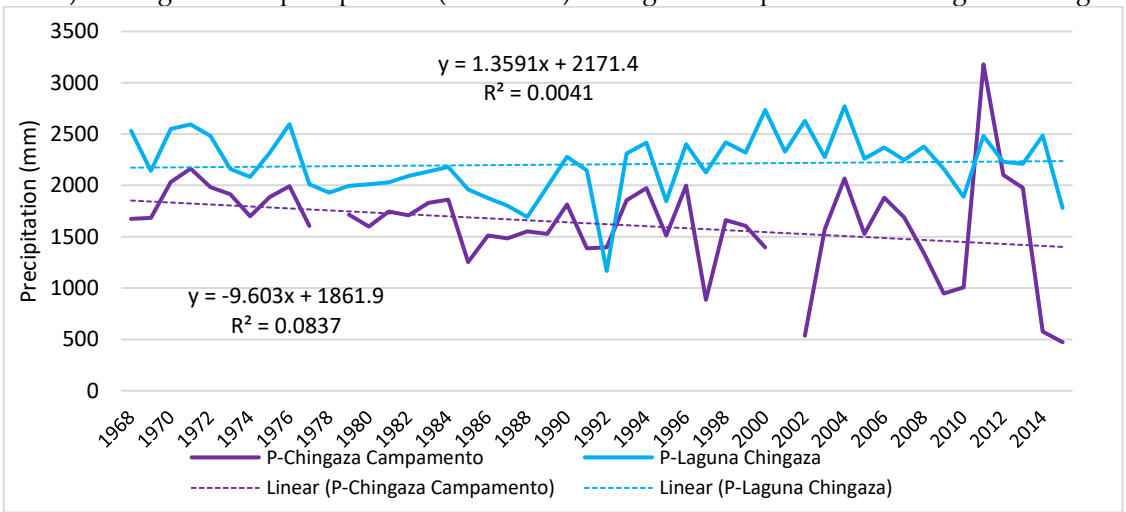

Figure S5. Time series of total annual precipitation in Chingaza Campamento (purple) and Laguna Chingaza (blue). Trend lines for linear fits are shown in dashed lines, along with correlation coefficients.

Figure S6) Average monthly precipitation (1968-2015): Chingaza Campamento and Laguna Chingaza

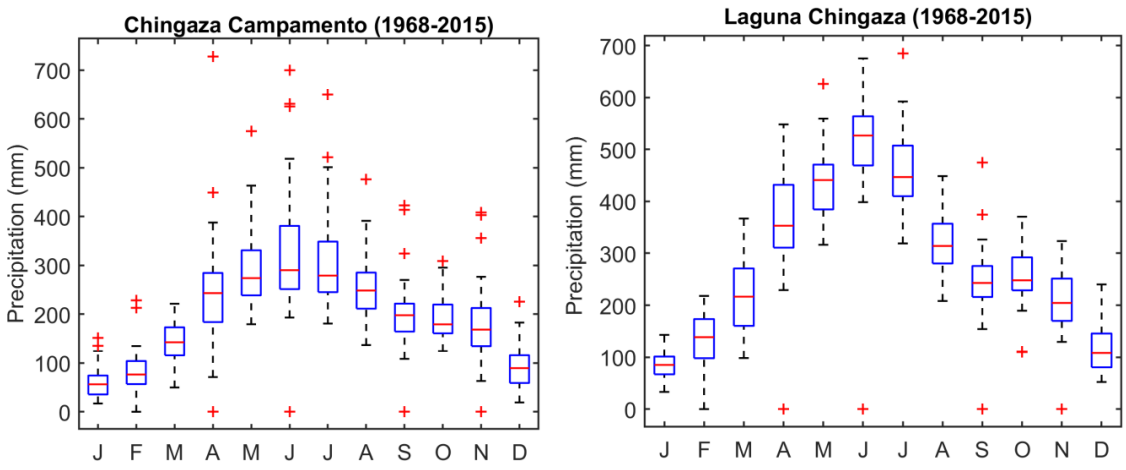

Figure S6. Boxplots of precipitation (in mm per month) for Chingaza Campamento and Laguna Chingaza during the period 1968-2015. The central mark in each box represents the median, while the top and bottom edges symbolize the 75th and 25th percentiles, respectively. The whiskers illustrate the most extreme values but does not include the outliers, which are plotted as red crosses.

Figure S7) Average monthly Tmin and Tmax in CNP: WorldClim data

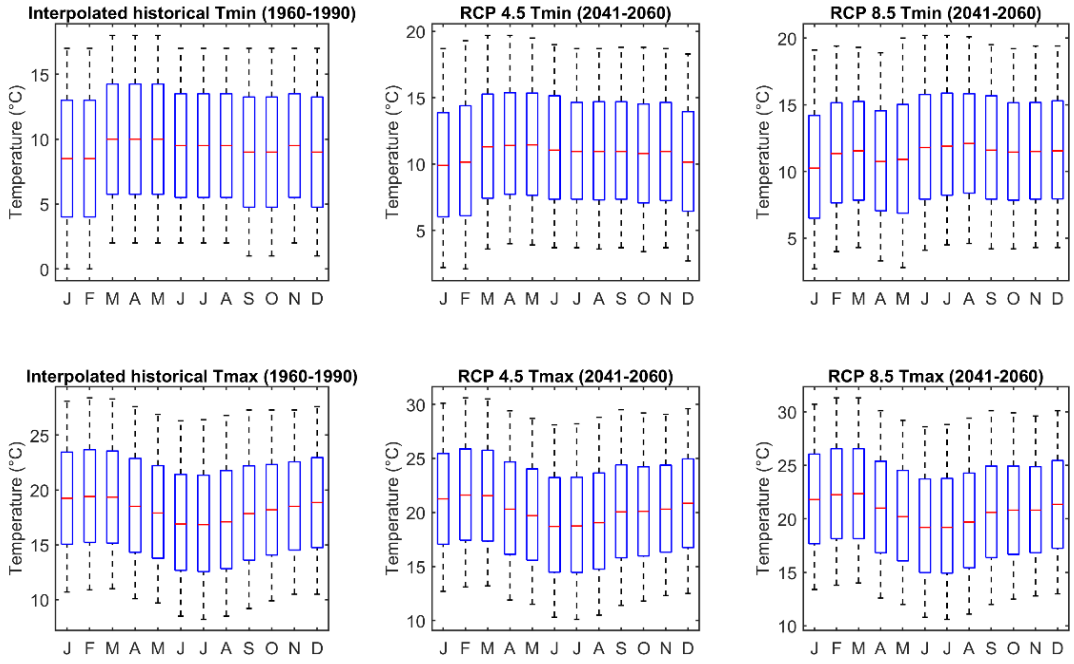

Figure S7. The boxplots represents the average long-term minimum (Tmin) and maximum (Tmax) temperatures (°C) for interpolated historical (1960-1990) and the RCP 4.5 and 8.5 scenarios (2041-2060). The central mark in each box represents the median, while the top and bottom edges symbolize the 75th and 25th percentile, respectively. The whiskers illustrate the most extreme values.

Figure S8) Average monthly precipitation in CNP: WorldClim data

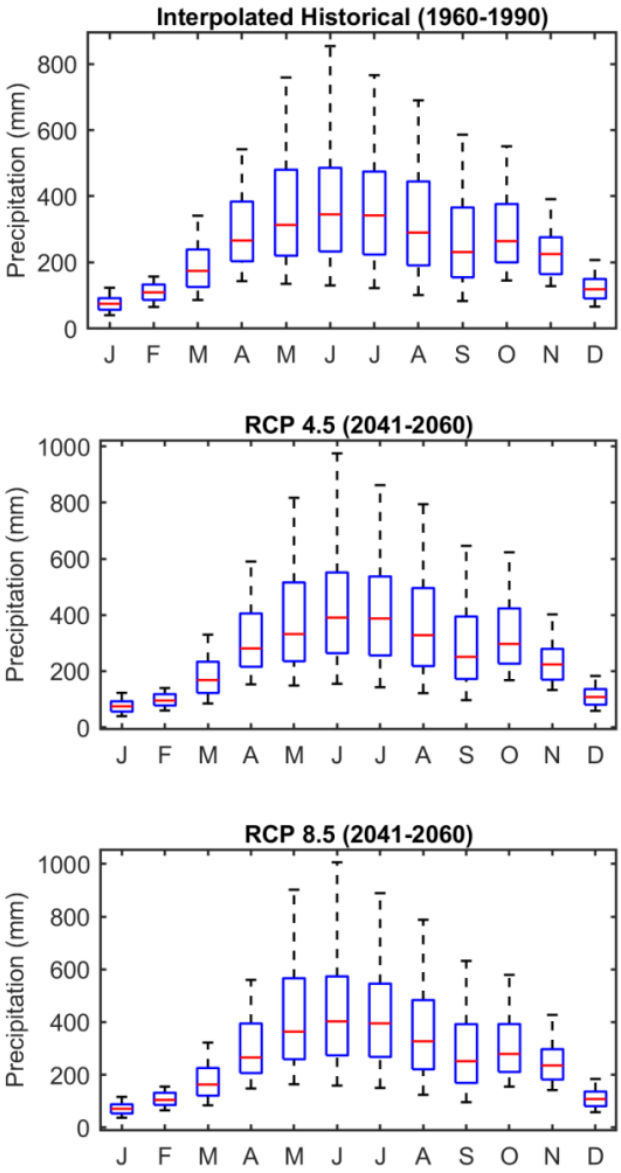

Figure S8. The boxplots represents the average long-term precipitation (mm) for interpolated historical (1960-1990) and the RCP 4.5 and 8.5 scenarios (2041-2060). The central mark in each box represents the median, while the top and bottom edges symbolize the 75th and 25th percentile, respectively. The whiskers illustrate the most extreme values.

Table S1) Precipitation stations in CNP.

Table S1. Data related to all the 15 precipitation stations across CNP (Figure 4) used to calculate the Thiessen polygon areas. It also gives the elevation (m a.s.l.) and the coordinates for each station. The average annual precipitation (P (mm)) is estimated with the Thiessen polygon method.

Station	Annual average P (mm)	Thiessen polygon area (m^2)	Elevation (m a.s.l.)	Coordinates (Lon, Lat)
1) Chingaza Campamento	1604	7973742	3250	4.5333, -73.7666
2) Laguna Chingaza	1607	26310981	3250	4.5333, -73.7500
3) Alto del Gorro	2370	81500624	3750	4.4833, -73.7500
4) La Playa	1182	63732828	3100	4.5500, -73.7666
5) Chuza Campamento	2168	16643661	3100	4.6666, -73.8333
6) Chuza Presa Golilas	3063	48477238	3008	4.5833, -73.7000
7) Palacios Guasca	1560	73480944	3760	4.7166, -73.8166
8) Laguna Marranos	1289	65802301	3090	4.6666, -73.8533
9) Chuchilla Golilas	2048	29145090	3350	4.5833, -73.7000
10) Laguna Seca	1662	27172787	3620	4.6833, -73.7666
11) Tunel el Diamante	1745	38382357	3350	4.6333, -73.7500
12) Barajas	1704	9685174	3500	4.6833, -73.7500
13) San José	2101	60265739	3463	4.5249, -73.7040
14) San Juanito Meta	2077	264122207	2020	4.4666, -73.6833
15) Chuchilla de Chuza	1689	91511980	3300	4.6002, -73.7027

Table S2) Data sources used in this study

Table S2. Data sources.

Data	Parameter	Format	Resolution	Source
DEM (SRTM30)	Elevation	Grid	30 arc sec (~1km)	http://www.diva-gis.org/gdata
DEM	Land cover	Grid	30 arc sec (~1km)	http://www.diva-gis.org/gdata
DEM (ASTGTM2)	Elevation	Grid	30 arc sec (~1km)	https://earthexplorer.usgs.gov/
Shape-files	Administrative boarders, land features etc.	Vector, points, lines		http://www.diva-gis.org/gdata
Shape-file	Metrological and hydrological stations	Points		http://www.ideam.gov.co/
Shape-file	Páramo extension and Ramsar sites	Vector	1:25 000	http://www.siac.gov.co/catalogo-de-mapas
Excel-files	Daily precipitation and discharge. Monthly temperature			Data provided by researchers at CNP
WorldClim 1.4	Average monthly minimum, maximum temperature, and precipitation	Grid	30 arc sec (~1km)	http://worldclim.org/