CLIMATES, PART 2

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After having focussed on the influence of light in our last article, we will now look at two other factors that influence the environment in which our animals live, namely temperature and humidity. These two factors are the main criteria we use to distinguish between the different climates on earth.

DEFINITION

The climate is the average weather condition, measured over a large area and a large number of years (usually 30).

The key words here are *average* and *large* and it's these terms that make the difference between climate and weather. (For comparison, *the weather* is described as: *the condition of the atmosphere at a certain place and moment.* Short and local therefore.)

With climates there is also a differentiation between macro- and microclimates. The microclimates don't quite conform to the given definition, they are limited to small areas (for instance a south facing mountainside or wall, that is consequently a little warmer and drier than the surrounding area). We will come back to microclimates, as they are also important for our animals.

DESCRIBING CLIMATES

In order to differentiate between different (macro) climates, different ways of classifying have been thought of by different people. The method by mister Köppen, is the one that is most often used. In this article we will use his categories. Köppen uses the criteria of temperature and precipitation, but not always to the same measure. This makes it difficult to just give the different categories without any explanation. Therefore we will now have some theoretical background information.

THE CAPITAL LETTERS

Köppen has assigned a capital letter to every climate he distinguished. This gave the following result:

A climates

These are tropical climates. They distinguish themselves on the grounds that the temperature in the COLDEST month is still ABOVE 18 degrees Celsius, besides that there is quite a lot of precipitation, at least 50 cm a year.

B climates

These are the desert and steppe climates. They are classified on the basis of the amount of precipitation related to the temperature (therefore the evaporation). The formulas needed to do this accurately are beyond the scope of this article. Simplified it boils down to the following. In a desert there is LESS than 20 cm of precipitation in a year and on a steppe BETWEEN 20 and 50 cm. Almost all deserts are, at least part of the year, very warm. The yearly average temperature is nevertheless below that of tropical climates, mostly because the nights are much colder.

C climates

These are the climates with a COLDEST month between –3 and 18 degrees Celsius. The WARMEST month is on average ABOVE 10 degrees. They are also called maritime climates. Mild winters and summers that are not too warm, like in the Netherlands.

D climates

These are the climates with a COLDEST month below –3 degrees Celsius and a WARMEST month of,

again, ABOVE 10 degrees Celsius. These are also called continental climates. Cold winters and hot summers, like in large parts of Russia.

E climates
This is the last capital used by Köppen. These climates have a WARMEST month BELOW 10 degrees Celsius. These are polar, tundra and high mountain climates. They are hardly important for terrarium keepers.

With the A, C and D climates we have to note well that the yearly precipitation is above the 50 cm limit. If, based on temperature, a climate conforms to the requirement: coldest moth above 18 degrees Celsius, but there is less than 50 cm of precipitation, then this last fact becomes overriding. A tropical desert or steppe therefore. To use the word tropical for deserts is not non-sensical, there are also temperate deserts with quite cold winters, for instance the Gobi desert in central Asia. With the E climates the amount of precipitation doesn't weigh as heavily. If it thaws only three months per year, these months are always moist, due to melting snow. Below 10 degrees Celsius in the warmest month remains E, even if there is only 20 cm of precipitation.

REFINEMENTS

In order to increase the accuracy of his classification, Köppen added the lower case letters s, w and f to the capital letters for the A, C and D climates.

- The letter s, stands for "sommertrocken" or dry summers.
- The letter w, stands for "wintertrocken", dry winters.
- The letter f finally stands for "feucht" precipitation in all seasons.

An example for clarification. According to Köppen's classification the Netherlands have a Cf climate. Namely, a winter between –3 and 18 degrees Celsius, a summer above 10 and precipitation in all seasons.

ADDITIONAL POSSIBLE AND IMPOSSIBLE COMBINATIONS

To add the lower case letters s, w and f to desert or polar climates would not make a lot of sense. A desert that is dry in summer is obvious and every day it isn't thawing at the Pole is dry. Nevertheless, Köppen wanted to make some distinctions here as well. Therefore, in order to complete the list, the following combinations of letters. They won't be mentioned in the rest of the article but may be encountered in atlases.

BW: Desert climate
BS: Steppe climate
ES: Snow climate
ET: Tundra climate
EH: High mountain climate

MAPS, TABLES AND GRAPHS

Climate data are usually presented in three ways.

In atlases by maps, with a different colour for every climate that is distinguished. Tropical is often green (jungle?), desert yellow (sand?) etc. In the legends we can find the right combination of letters. While good to get a quick overview, there are a few disadvantages to this method. The main one is inaccuracy. Because the maps represent a large area, all details are lost. It is therefore better to use graphs or tables.

Graphs look as follows, fig. 1:
At the bottom are the months of the year, to the left the temperature and to the right the precipitation in millimetres. Per agreement, a continuous line through the months represents the temperature, while the amount of precipitation is shown with columns.

What a climate table looks like can be seen in fig. 2, in the elaborated example.

FINALLY

If we have information about the origin of our animals we can look for accurate data concerning the climate of that area. When we have found those figures and combined them with what we already know about the length of day and night, we can provide the animals with the right (changing) amount of light, heat and humidity year round. We think that a good imitation of the climate can prevent stress in snakes, certainly in wild caught specimens.

EXAMPLE

In order to clarify things at the end of this theoretical story, an elaborated example is added. The data used came from a book with the climate data from 1178 weather stations, spread over almost the whole world. We'll, again, use the 'Miami phase' *Elaphe g. guttata*, the Red Ratsnake as an example. These animals come from Florida, USA. The data in figure 2 are those of Jacksonville, located in the northern part of the state.

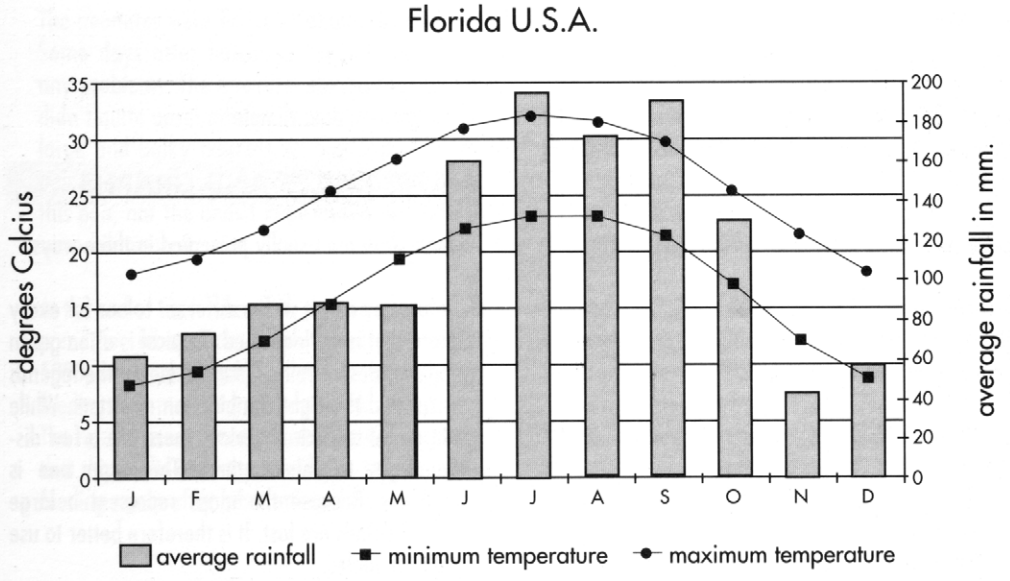

Fig.1; climate-grafic of an Aw-climate

Not all data are useful to use right now, we'll limit ourselves to temperature and humidity. We see that the maximum average daytime high is 18.3 degrees Celsius in January, at night the average is then 8.3 degrees.

In July it is, on average 32.2 degrees during the day and 23.3 degrees at night. The average precipitation is also highest in the warmest months. But take care, there is also a lot of evaporation at that time, so the humidity is not too bad. In other words don't keep the animals too moist.

Translation: Ron Winkler
Corrections: Mark Wootten

Station/Land: Jacksonville (Florida)USA Lage 30?25'N/81?39'W Höhe Ÿ. NN 7 m Klimatyp: Köppen Cfa		j	f	m	a	m	j	j	a	s	o	n	d	Jahr	Z
1 Mittl. Temperatur	°C	13,3	14,2	16,8	20,4	24,3	27,1	28,1	27,9	26,3	21,3	16,5	13,4	20,8	30
2 Mittl.max.d.Temp.	°C	18,3	19,4	22,2	25,6	28,3	31,1	32,2	31,7	30,0	25,6	21,7	18,3	25,6	76
3 Mittl.Min.d.Temp.	°C	8,3	9,4	12,2	15,6	19,4	22,2	23,3	23,3	21,7	17,2	12,2	8,9	16,1	76
4 Absol.Max.d.Temp.	°C	28,9	30,0	32,8	33,3	37,2	38,3	40,0	38,3	37,2	35,0	30,0	28,3	40,0	78
5 Absol.Min.d.Temp.	°C	-9,4	-12,2	-3,9	1,1	7,8	12,2	18,3	17,8	9,4	2,8	-3,9	-10,0	-12,2	78
6 Mittl.rel.Feuchte	%	73	69	68	67	65	70	72	76	76	74	73	75	72	13
7 Mittl.Niederschlag	mm	62	74	89	90	88	161	195	174	192	131	43	56	1355	30
8 Max.Niederschlag	mm	232	233	318	209	376	592	380	420	553	413	181	197		87
9 Min.Niederschlag	mm	<1	3	3	3	2	32	4	19	2	2	<1	tr		87
10 Max.Niederschl.24h	mm	66	63	82	124	129	101	94	99	258	169	107	64	258	19
11 Tage m/Niederschlag	>0.25mm	7	8	9	7	8	11	15	14	15	9	6	8	117	19
12 Sonnenscheindauer	h	192	189	241	267	269	260	255	248	199	205	195	170	2713	30
14 Potent.Verdunstung	mm	24	29	53	78	120	151	166	154	124	76	40	24	1039	51
15 Mittl. windgeschw.	in m/sec	4	4	4	4	4	4	3	3	4	4	4	4	4	11
16 Vorherschende Windr.		NW	WNW	NW	SE	WSW	SW	SW	SW	NE	NE	NW	NW		11

Fig. 2; Climate-chart