



METEOROLOGICAL DATA

KÖPPEN CLIMATE CLASSIFICATION

Köppen classification is based on the concept that native vegetation is the best expression of climate. Thus, climate zone boundaries have been selected with vegetation distribution in mind. It combines average annual and monthly temperatures and precipitation, and the seasonality of precipitation¹. The classification scheme divides climates into five main groups (A, B, C, D, E), each having several types and subtypes. Each particular climate type is represented by a two to four letter symbol (Figure 1). Table 1 describe the main characteristics of each of the Köppen weather zones available in Europe.

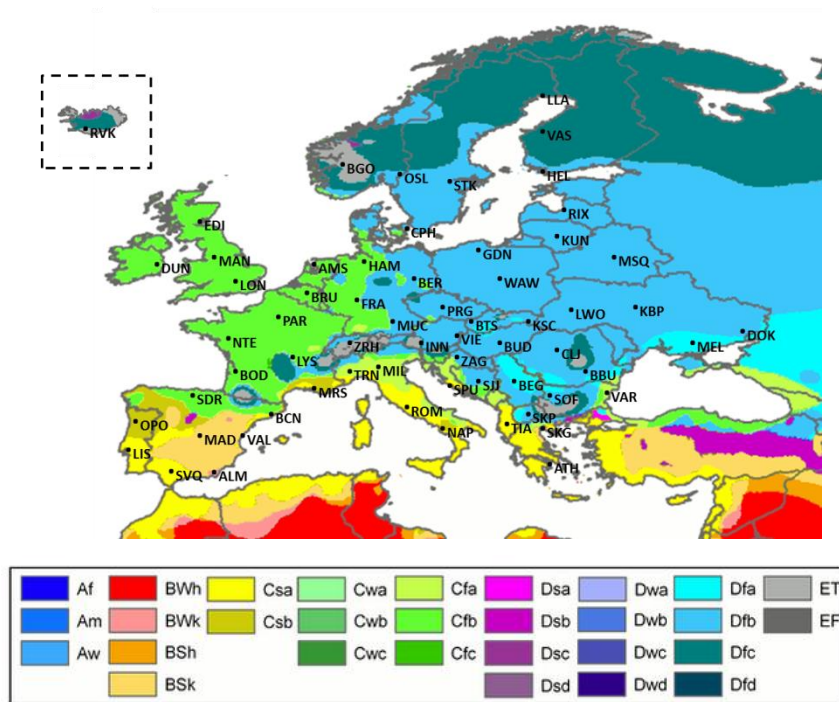


















Figure 1 European weather zones and cities selected.

¹ Wikipedia, "Koppen climate classification," Wikipedia, [Online]. Available: http://en.wikipedia.org/wiki/K%C3%B6ppen_climate_classification. [Accessed 2015].



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Table 1 Description of the Köppen classification for the different weathers in Europe.

Climate region	Precipitation pattern	Degree of summer heat									
<p>B (Arid)</p>	<p>S (Steppe)</p> 	<p>h (Hot)</p> <p>k (Cold)</p>									
Comments											
<p>These climates are characterized by actual precipitation less than a threshold value set equal to the potential evapotranspiration.</p> <ul style="list-style-type: none"> • h means low-latitude climate (average annual temperature above 18 °C). • k means middle-latitude climate (average annual temperature below 18 °C). 											
<p>C (Temperate)</p>	<table border="0" style="width: 100%; text-align: center;"> <tr> <td style="width: 33%;">s (Dry Summer)</td> <td style="width: 33%;">w (Dry Winter)</td> <td style="width: 33%;">f (Without Dry season)</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </table>	s (Dry Summer)	w (Dry Winter)	f (Without Dry season)							<p>a (Hot Summer)</p> <p>b (Warm Summer)</p>
s (Dry Summer)	w (Dry Winter)	f (Without Dry season)									
											
											
Comments											
<p>These climates have an average monthly temperature above 10 °C in their warmest months, and an average monthly temperature above -3 °C in their coldest months.</p> <p>The precipitation pattern:</p> <ul style="list-style-type: none"> • w indicates dry winters • s indicates dry summers • f means significant precipitation in all seasons <p>The degree of summer heat:</p> <ul style="list-style-type: none"> • a indicates warmest month average temperature above 22 °C with at least four months averaging above 10 °C • b indicates warmest month averaging below 22 °C but with at least four months 											



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averaging above 10 °C			
<p>D (Cold Continental)</p>	<p>s (Dry Summer)</p>	<p>w (Dry Winter)</p>	<p>f (Without Dry season)</p>
			<p>b (Warm Summer)</p> <p>c (Cold Summer)</p>
Comments			
<p>These climates have an average temperature above 10 °C in their warmest months, and a coldest month average below -3 °C. The precipitation pattern:</p> <ul style="list-style-type: none"> • w indicates dry winters • s indicates dry summers • f means significant precipitation in all seasons <p>The degree of summer heat:</p> <ul style="list-style-type: none"> • b indicates warmest month averaging below 22 °C but with at least four months averaging above 10 °C • c means three or fewer months with mean temperatures above 10 °C 			
<p>E (Polar)</p>	<p>T (Tundra)</p>		
Comments			
<p>These climates are characterized by average temperatures below 10 °C in all 12 months of the year.</p>			



LOCATION SELECTION

Different European cities have been selected in order to represent the European climate zones (Figure 2). Each city has also been associated by a climate zone from the Köppen classification (Figure 1). For each of the climate zones in Europe, at least 3 cities were selected. It is important to keep in mind that these locations do not represent the climate conditions of the entire country or regions, but are an example for the conditions in the climate zone they are located in. In all the cases, Meteonorm² weather files were used to generate the weather data base.



Figure 2 European cities selected for the weather data base

Table 2 shows the annual average wet and dry bulb temperatures for each of the selected locations. This table aims to identify similar locations available in the RenewIT tool with the location that the user wants to evaluate but it is not in the selection map.

² "Meteonorm" 2015. [Online]. Available: <http://www.meteonorm.com>.



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Table 2 Annual average wet and dry bulb temperatures for the cities selected.

City	Country	Climate zone		Temperature [°C]		
		Group	Subgroup	Wet bulb	Dry bulb	
Amsterdam	AMS	The Netherlands	C	Cfb	14.63	17.87
Almeria	ALM	Spain	B	Bwk	8.14	10.75
Athens	ATH	Greece	C	Csa	14.99	18.26
Barcelona	BCN	Spain	C	Csa	12.97	16.03
Belgrade	BEG	Serbia	D	Dfa	9.97	12.82
Bergen	BGO	Norway	E	Et	5.66	8.01
Berlin	BER	Germany	D	Dfb	7.71	10.34
Bordeaux	BOD	France	C	Cfb	10.12	12.97
Bratislava	BTS	Slovakia	D	Dfb	8.42	11.14
Brussels	BRU	Belgium	C	Cfb	8.43	11.07
Bucharest	BBU	Romania	D	Dfb	8.98	11.8
Budapest	BUD	Hungary	D	Dfb	8.74	11.5
Cluj	CLJ	Romania	D	Dfb	7.07	9.71
Copenhagen	CPH	Denmark	D	Dfb	5.38	7.79
Donetsk	DOK	Ukraine	D	Dfb	6.5	9.08
Dublin	DUN	Ireland	C	Cfb	7.56	10.11
Edinburgh	EDI	Scotland	C	Cfb	7.25	9.67
Frankfurt	FRA	Germany	C	Cfb	8.43	11.11
Gdansk	GDN	Poland	D	Dfb	6.1	8.55
Hamburg	HAM	Germany	C	Cfb	7.22	9.77
Helsinki	HEL	Finland	D	Dfb	4.1	6.39
Innsbruck	INN	Austria	E	Et	6.51	9.05
Kaunas	KUN	Lithuania	D	Dfb	5.38	7.79
Kiev	KBP	Ukraine	D	Dfb	6.47	9.02
Kosice	KSC	Slovakia	D	Dfb	7.21	9.82
Lisbon	LIS	Portugal	C	Csa	14.33	17.54
London	LON	UK	C	Cfb	8.9	11.57
Lulea	LLA	Sweden	D	Dfc	1.35	3.42
Lvov	LWO	Ukraine	D	Dfb	5.93	8.42
Lyon	LYS	France	C	Cfb	10.12	12.97
Madrid	MAD	Spain	B	Bsk	13.94	17.08
Manchester	MAN	UK	C	Cfb	8.1	10.64
Marseille	MRS	France	C	Csb	12.37	15.42



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City	Country	Climate zone		Temperature [°C]		
		Group	Subgroup	Wet bulb	Dry bulb	
Melitopol	MEL	Ukraine	D	Dfa	7.56	10.23
Milano	MIL	Italy	C	Cfa	11.25	14.24
Minsk	MSQ	Belarus	D	Dfb	5.21	7.63
Munich	MUN	Germany	D	Dfb	6.77	9.31
Nantes	NTE	France	C	Cfb	8.84	11.57
Napoli	NAP	Italy	C	Csb	13.44	16.56
Oslo	OSL	Norway	D	Dfb	4.9	7.24
Paris	PAR	France	C	Cfb	9.51	12.27
Porto	OPO	Portugal	C	Csb	13.49	16.59
Prague	PRG	Czech Republic	D	Dfb	7.1	9.67
Reykjavik	RVK	Island	D	Dfc	3.34	5.45
Riga	RIX	Latvia	D	Dfb	5.01	7.39
Rome	ROM	Italy	C	Csa	13.53	16.71
Santander	SDR	Spain	C	Cfb	12.05	15.07
Sarajevo	SJJ	Bosnia and Herzegovina	D	Dfb	7.4	10.03
Seville	SVQ	Spain	C	Csa	15.08	18.36
Skopje	SKP	Macedonia	D	Dfb	9.52	12.39
Sofia	SOF	Bulgaria	D	Dfb	7.99	10.69
Split	SPU	Croatia	C	Csa	13.26	16.36
Stockholm	STK	Sweden	D	Dfb	5.45	7.85
Thessaloniki	SKG	Greece	C	Csa	12.48	15.57
Tirana	TIA	Albania	C	Csa	13.36	16.51
Turin	TRN	Italy	C	Cfa	-7.31	-6.13
Vaasa	VAS	Finland	D	Dfc	2.58	4.75
Varna	VAR	Bulgaria	C	Csa	14.54	17.76
Valencia	VAL	Spain	B	Bsk	9.55	12.37
Vienna	VIE	Austria	D	Dfb	8.77	11.5
Warsaw	WAW	Poland	D	Dfb	6.49	9.02
Zagreb	ZAG	Croatia	D	Dfb	10.77	13.71
Zurich	ZRH	Switzerland	E	Et	7.39	9.98