Heat-health warning systems in Europe

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Introduction

- Hot weather and extreme events can kill and cause illness
- Adverse health effects of heat-waves are preventable
- Heat-waves can be predicted

Responses to heat waves:

1. Heat Health Warnings Systems HHWSs (short-range)
2. Medium range forecasting to help Health Services improve planning

Heat Health Warning Systems HHWSs

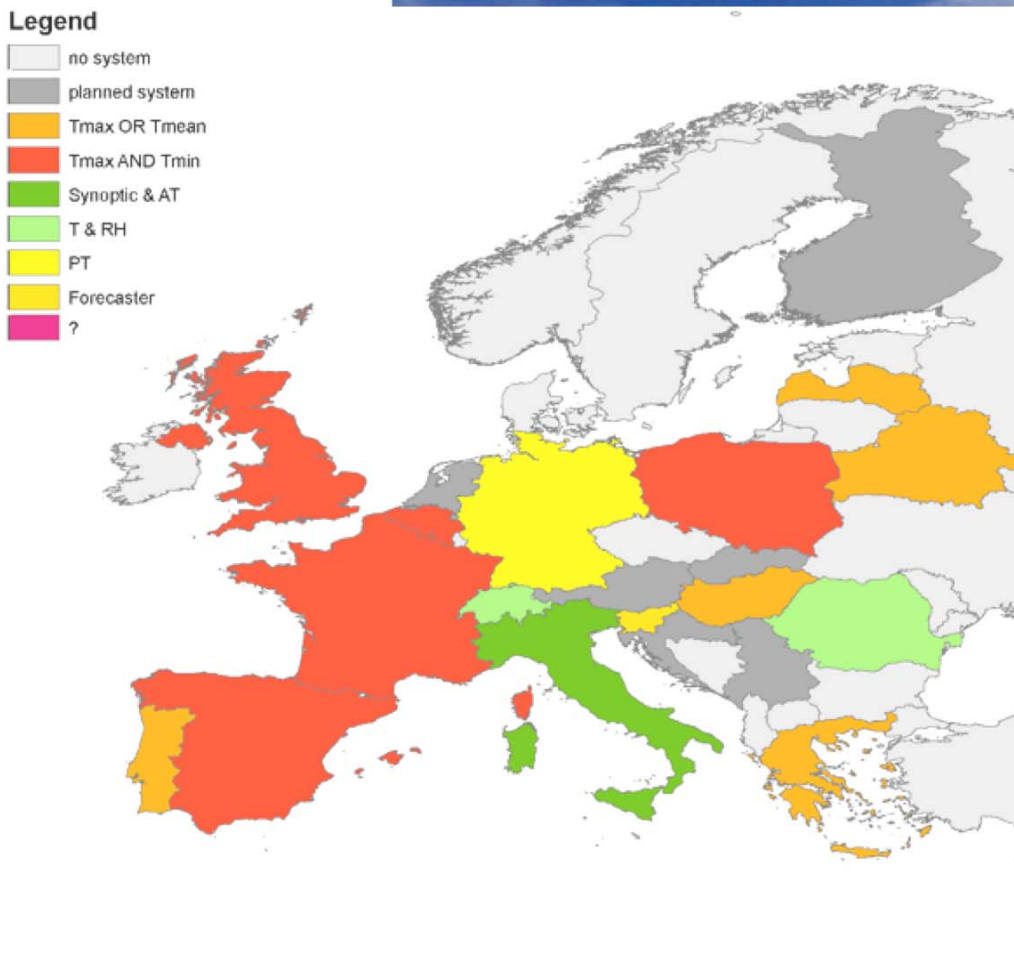
HHWSs use weather forecasts to predict heat situations with potential adverse effects for human health

Data sources:

- questionnaire sent to the National Meteorological and Hydrological Services (NMHS) in 2006
- e-mails to the NMHSs in 2009 (asked about changes in HHWS)
- web-pages of NMHSs or responsible institutions

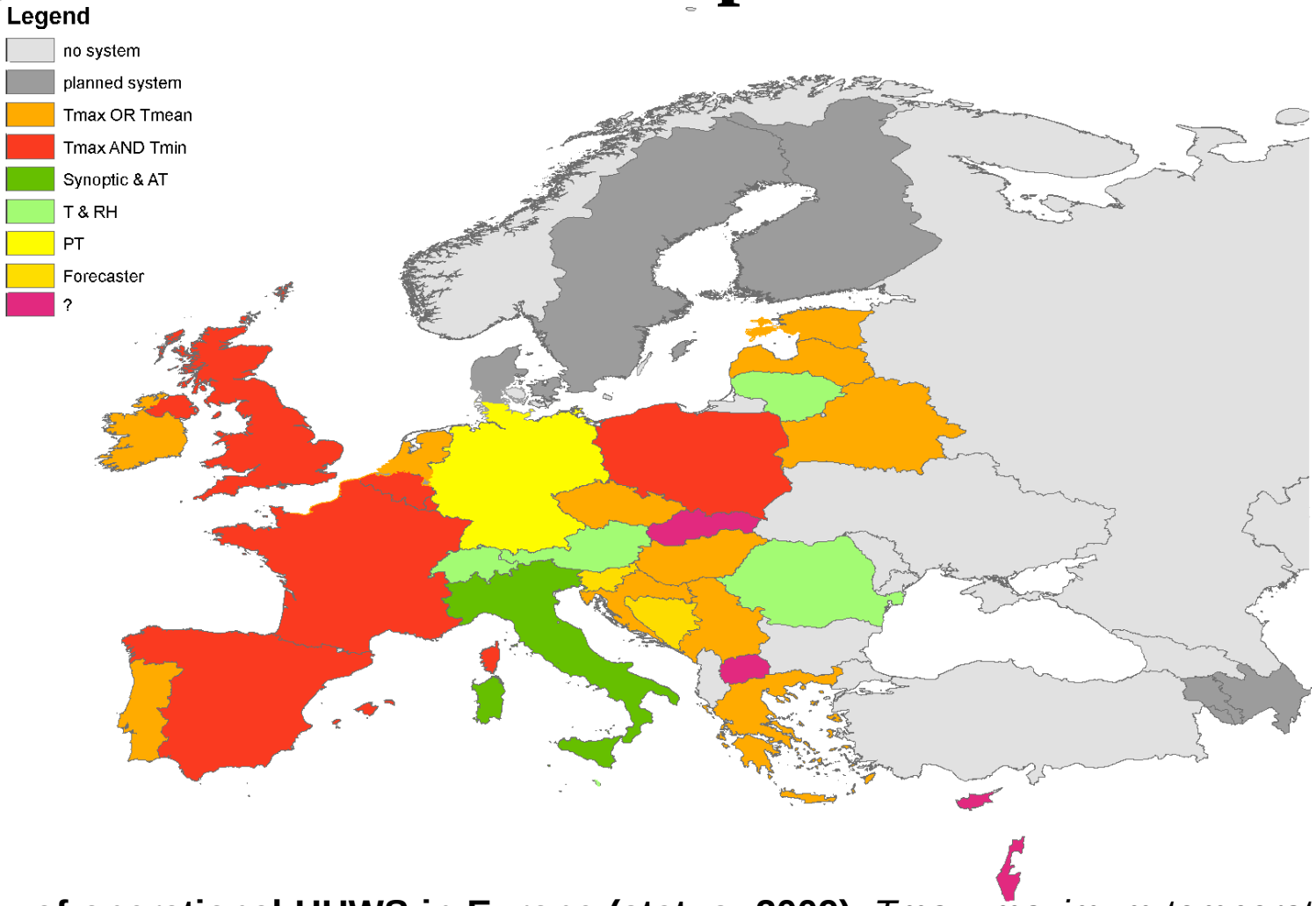
Before 2003 only Portugal and Rome had Heat Health Warning Systems

HHWSs in Europe in 2006



- 16 countries with HHWSs could be identified
- most systems implemented after 2003
- different methods (heat wave definitions)
- sometimes regional specific thresholds
- not all countries have heat plans
- lead times: 1 - 3 days

HHWSs in Europe in June 2009



Taxonomy of operational HHWS in Europe (status: 2009). *Tmax: maximum temperature; Tmean: mean temperature; Tmin: minimum temperature; AT: apparent temperature; T: Temperature; RH: relative humidity; PT: perceived temperature. ?: not known.*

Single- or few-parameter methods

Are based on thresholds of air temperature (mean, maximum, minimum) or simple thermal indices such as apparent temperature (a combination of air temperature and humidity).

Maximum temperature (the lowest thresholds)

Ireland 23-28°C
The Netherlands 27°C for 5 days
Belarus 30°C, **Estonia** and **Czech** 30°C > 2 days
Latvia 27-32°C for 6 days or 33°C for 1 day
Croatia and **Luxemburg** 35°C
Greece 39°C
Serbia ???

Portugal - ÍCARO index; maximum, minimum or sudden rise of temperature; can be based on these and some other factors like fires, ultraviolet radiation, weather stress index

Single- or few-parameter methods

Daily mean temperature

Hungary >25°C

Minimum and maximum temperature

Belgium + ozone data,
France,
England,
Spain

Assessment of Forecaster

Bosnia and Herzegovina, Slovenia

Single- or few-parameter methods

Simple thermal indices

Lithuania – Humidex

Austria, Switzerland – Heat index

Malta – Heat stress index

Romania – Temperature humidity index (ITU)

Unknown

Slovakia

Macedonia

Cyprus

Multiple-parameter methods

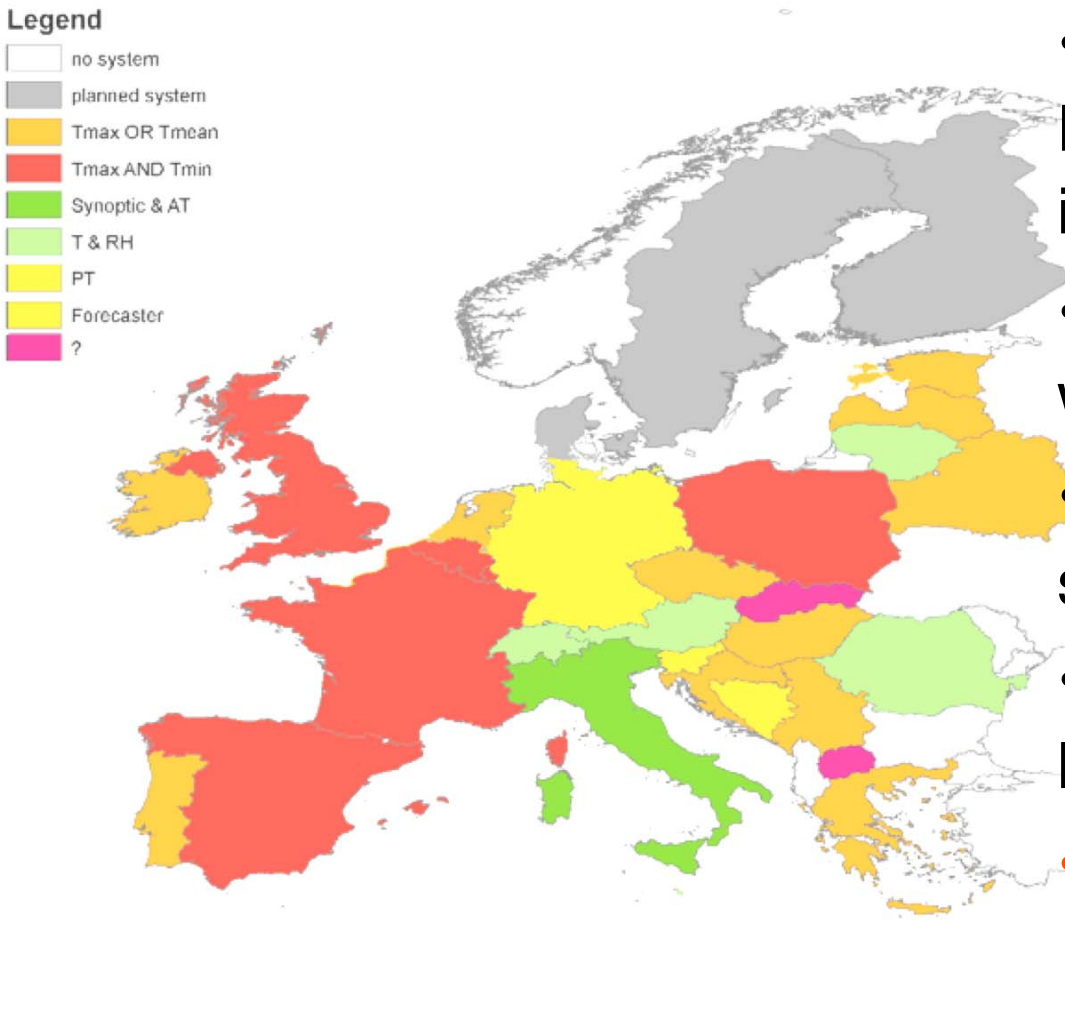
Rely on heat budget models

Germany

Apparent Temperature or Synoptic approach (air mass based):

Italy

HHWSs in Europe in June 2009



- 29 countries with HHWSs could be identified
- different methods (heat wave definitions)
- sometimes regional specific thresholds
- not all countries have heat plans
- lead times: 1 - 5 days

Time Scales in Meteorology

short range:	**< = 3 days**	**[hour - day]**	**HHWS**
medium-range:	**< = 10 (15) days**	**[day]**	**heat info**
monthly-range:	**<= 1 month**	**[week]**	
seasonal-range:	**<= 3 - 7 months**	**[month - season]**	
annual-range:	**<= 12 (13) months**	**[season]**	

German HHWS

- Heat health warning system for the short range:
  lead-time = 48 hours
- Perceived Temperature at 12UTC
- Germany: “warning regions”
- deterministic

Heat or extreme heat warning

EuroHEAT system

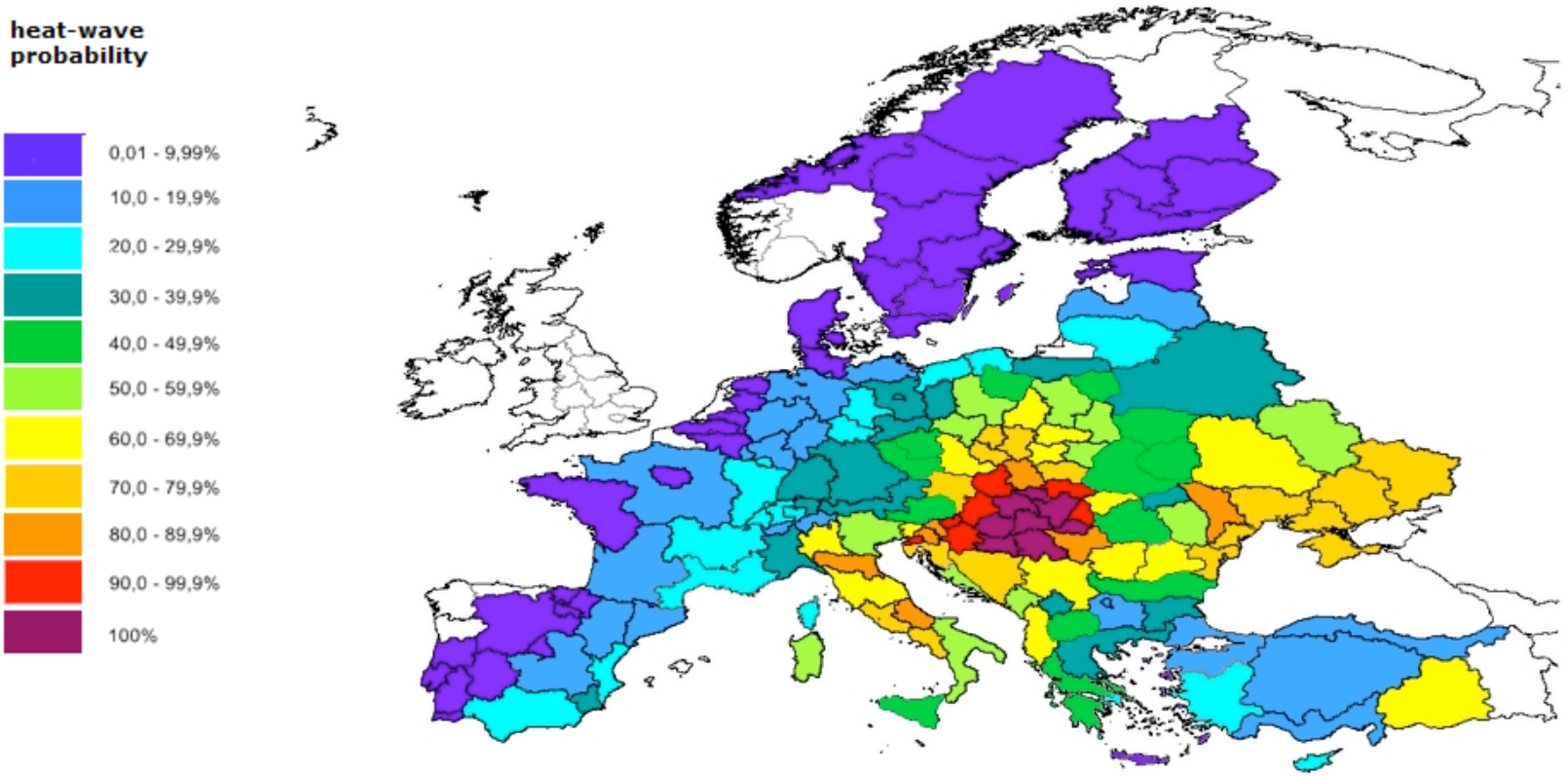
- Heat **information** system for the medium range:
  lead time 240 hours
- Air temperature at 12UTC
- Europe: administrative regions
- probabilistic

Problem: skill of humidity, wind and cloud cover forecast after day +3

Probability that temperature exceeds threshold for heat

EuroHEAT: Probabilistic heat forecast (July 2009)

Issued: 10.07.2009 For: 16.07.2009



EuroHEAT

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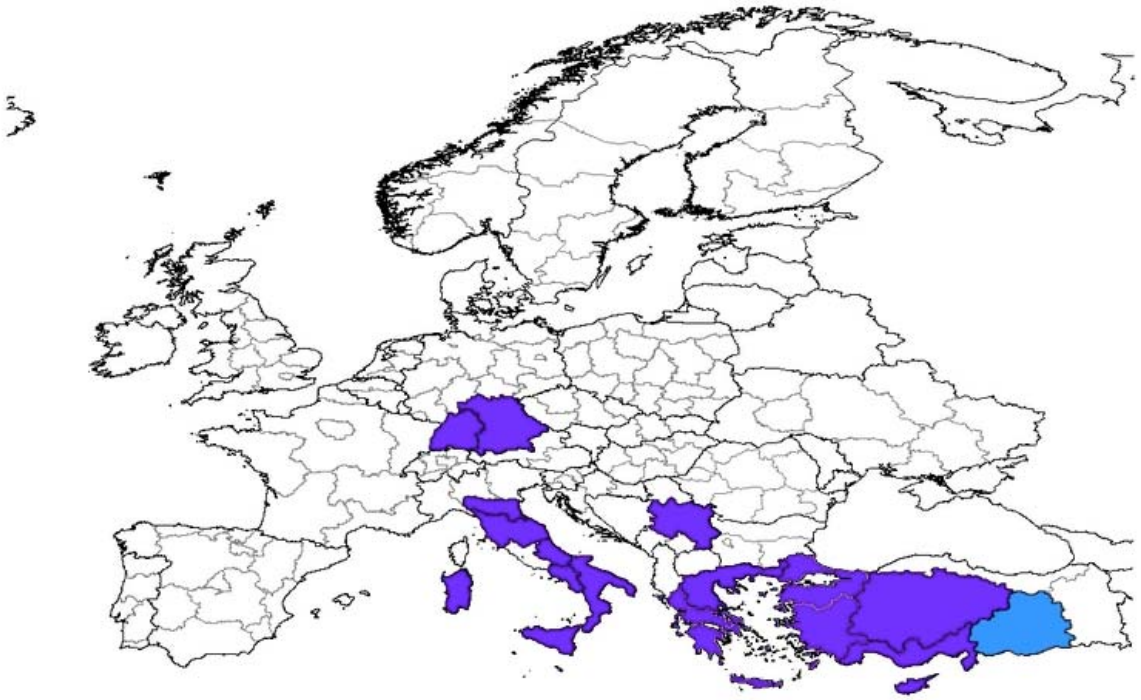
Forecasts

Issued: 25. Sep 2007 For: 02. Oct 2007

Issued: 25.09.2007 For: 02.10.2007



heat-wave probability

- 0,01 - 9,99%
- 10,0 - 19,9%
- 20,0 - 29,9%
- 30,0 - 39,9%
- 40,0 - 49,9%
- 50,0 - 59,9%
- 60,0 - 69,9%
- 70,0 - 79,9%
- 80,0 - 89,9%
- 90,0 - 99,9%
- 100%

The probabilities for a heat-wave are calculated based on 51 different forecasts (50 ensemble forecasts and 1 control run) with slightly different initial conditions for each point.
Especially for longer lead times heat-wave probabilities of 30% and more indicate that there might be an upcoming heat-event. The heat-wave probabilities displayed on the map are mean probabilities for a region. In regions with big differences in elevation or coastal regions the actual heat-wave probability can differ significantly within a region. The flyer: **"How to use the medium range heat information tool"** contains further information.
Please note that the medium-range heat information does not substitute national heat-warnings, but complements the national warning system with medium-range heat forecasts.

Internet 100%

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HHWS Europe

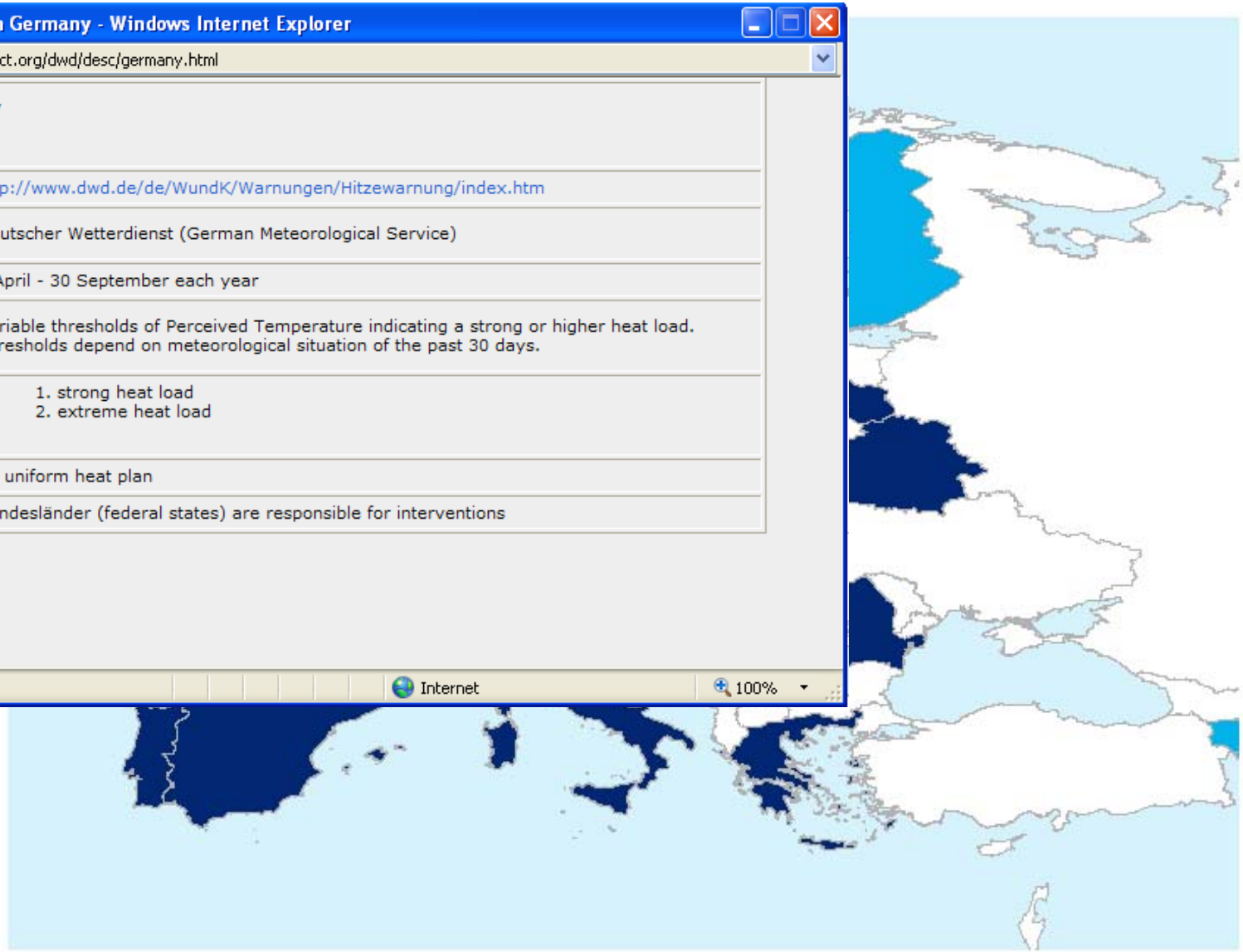
HHWS description Germany - Windows Internet Explorer

http://euroheat-project.org/dwd/desc/germany.html

Germany

Web-site	http://www.dwd.de/de/WundK/Warnungen/Hitzewarnung/index.htm
Warnings issued by	Deutscher Wetterdienst (German Meteorological Service)
Warning season	1 April - 30 September each year
Criteria for calling heat warnings	Variable thresholds of Perceived Temperature indicating a strong or higher heat load. Thresholds depend on meteorological situation of the past 30 days.
Level of warnings	1. strong heat load 2. extreme heat load
Heat plan	No uniform heat plan
Remarks	Bundesländer (federal states) are responsible for interventions

Internet 100%



Thank you!

Source: www.valstietis.lt

-Go, and do not come back without air-conditioner!!!