

# Climate change and emergency response

photo: Sipa Press / Rex Features

How prepared are Europe's emergency services and civil defence forces for the shift in planning and operational requirements that climate change may bring about?

**C**IVIL DEFENCE DEPARTMENTS in Italy have expressed concern about the increasingly extreme weather some parts of the country have been experiencing, according to the Italian magazine, *Protezione Civile*. Indeed, an international report issued recently says that the country is set to be one of those worst affected by future global warming. But have other nations' emergency services prepared themselves for the shift in operational requirements that climate change may bring about?

This article is not an exhaustive look into the causes of, or discussions on global warming, nor is it a detailed examination of all of its implications. Instead, it will look at some examples of out of the ordinary weather that have been faced in recent years, mainly in Europe, with the aim of stimulating debate and ideas on the planning and operational challenges of the future.

Following on from this piece are two further articles that illustrate vulnerability to extreme weather hazards. On pages 22 and 23 Dr Barbara Carby explains how involving the community in hurricane response planning is helping to reduce casualties, while on page 24, we look at the disastrous monsoon rains that have laid waste to vast areas of India.

Extreme heat often leads to an increased demand in power in industrialised areas, which can put stresses on electricity supplies, leading to outages or collapse, as was the case in North

America in August 2003. Though not part of this feature, the articles on pages 32 and 35 explore the role of emergency services and planning in such eventualities.

The implications of climate change for emergency responders is not a subject that will go away; nor can it be covered in any satisfactory detail in just a few articles. Further perspectives will be published in *Crisis Response Journal* for many issues to come.

## Heat wave

The summer of 2003 is believed to have been the hottest in Europe for the past 500 years, with 15,000 people dying in France alone. But this could just be the beginning of many regular heatwave events, according to the WWF: "If global warming continues as predicted, this could become the norm."

It has since emerged that Italy was the worst affected area, with the Government releasing figures showing that 20,000 people fell victim to the heat.

The WWF predicts that Italy will be one of the EU countries worst affected by any future global warming, with overall rainfall levels shrinking still further and with many more prolonged and intense heat waves.

This year has already seen extreme heat in Italy, reports Giovanni Di Gaetano, with rivers drying up, sea temperatures rising and hydro

**Italy is experiencing a sustained period of low rainfall and many rivers are drying up – the river Po is at its lowest level for 90 years**

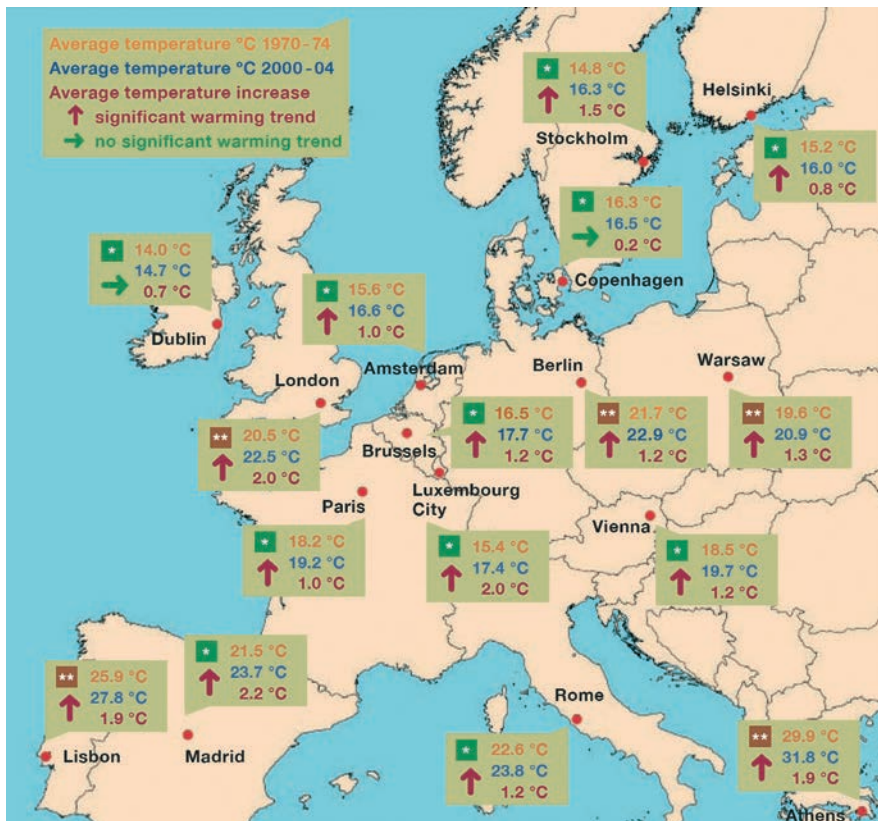
electric power stations coming under pressure. High temperatures have led to the Government warning that around a million people are at risk (see box on Italy's warning system) and the health of tens of thousands of people being monitored. High temperatures have led to higher electricity usage, with demands on power peaking dramatically as people use fans or air conditioning units to try to cool down.

## Low rainfall

Between Autumn 2001 and Winter 2003, a period of low rainfall caused a water crisis affecting the centre and south of Italy, leading to state of emergency alerts being issued in Basilicata, Puglia, Sardinia, Sicily, Umbria and the southern part of Rome.

Quoting research carried out by NOAA's Climate Prediction Centre, Giovanni Di Gaetano says the thermal anomaly of the last two summer seasons "Has involved half of France, Switzerland, Germany, Austria, Serbia and Croatia, as well as the whole northern area of Italy, with temperatures rising about five degrees higher than seasonal averages."

Italy's Head of Civil Protection, Guido Bertolaso, comments: "We have to get used to



**The WWF has analysed climate data for the 15 'old-EU' capital cities, and the Polish capital Warsaw. During the first five years of this decade, average, or mean, temperatures in 13 of the 16 cities were at least 1 °C higher than during the first five years of the 1970s. Europe's average temperature rose by 0.95 °C during the 20th century, says the WWF**

map: WWF International

this climate and temperature change. It is also alarming that the sea temperature is rising.”

In its report “Europe feels the heat” the WWF says that “the precise causes of individual heat waves are complex, but most climate scientists agree that global warming has probably made them more frequent and intense.”

In fact, the National Center for Atmospheric Research (NCAR) says that by using climate modelling to predict geographic patterns of future heat waves, it can predict that severe heat waves are likely to hit the Mediterranean and southern and western US in the latter half of the 21st Century (in July this year, a heat wave spreading east across the US was responsible for a number of deaths and thousands of cattle dying).

## Responses

“The Summer of 2003 will remain a summer of collective failure in France. Nearly 15,000 people died, killed by an unprecedented heat wave phenomenon and the system’s incapacity to meet this lethal event,” says Dr Patrick Lagadec.

A striking aspect of this disaster is that it was not a clear cut emergency. Its effects took a while to prompt an emergency response, and the true consequences only emerged later. Yet prior to this event, heat waves did not receive high prominence in news coverage – although they

were not an unknown phenomenon. In 1995 over 700 people died in a heat wave in Chicago, USA and 2,000 died in Athens in 1987. “But these crises did not always attract attention,” according to Dr Lagadec. Pointing out the characteristics of this crisis, he says that it took a long time to be recognised for what it was and to gear up response. Although a few people did try to raise the alarm, they were generally ignored, met with denial and an avoidance of crisis management. Added to this, he emphasises that it can be hard to perceive hot and sunny weather as a ‘problem’. At the time that thousands of people were dying from the heat, other more visual and more easily reportable events were taking place simultaneously in France. These included forest fires, water shortages, very high levels of pollution and potentially serious problems with nuclear power plants.

Extreme heat gives rise to a number of further problems briefly touched upon above. In Europe, it is estimated that the average number of climate related disasters doubled during the 1990s, compared to the previous decades.

Recent years have witnessed a dramatic increase in forest fires in the Mediterranean region, according to the European Commission. In 2003, the total area burnt by forest fires was 740,000 hectares (almost three times the surface

## Alerting the public

**Andrea Moschin** looks at a new warning system that has been developed in Italy to help reduce deaths from extreme heat among vulnerable populations

Prompted by serious and unpredictable heat waves which claimed many victims, particularly among the old and the very young, Italy has introduced a new alerting system for its larger cities.

The Heat Health Watch Warning System (HHWWS) is able to predict, up to 72 hours in advance, potentially hazardous environmental climate conditions that could be dangerous for people. When the temperature rises suddenly and conditions become tropical, this tends to lead to an increasing number of deaths among the elderly and people with cardiac conditions.

“In Italy, everybody remembers the summer of 2003. We had heat levels that we had never seen before – it started in June and remained constantly above the average temperature for the whole season,” says Dr Marco Monai, Director of the Veneto’s Regional Agency’s Meteorological Operative Unit, “And this caused many health problems for a large proportion of our population.” In fact, 2003 saw the hottest summer for 20 years, with fatalities rising to 15 per cent above the seasonal average. The Italian Government’s figures show that 20,000 people died during the heat wave, far more than was originally thought.

The alerting system has been developed with the Civil Defence Department, working with the Epidemiologic Department of Lazio Region. It was tested on four cities last year – environmentally critical conditions were recorded on 36 days. “The system is fine and ready to go; this year it will be applied in 12 large cities and a few smaller towns that are deemed to be at risk,” says Dr Marta Di Gennaro of the Civil Defence Department. Cities taking part in the system are: Rome, Milan, Turin, Bologna, Firenze, Palermo, Brescia, Venice, Bari, Napoli and Catania.

Based on meteorological forecasts, the system checks whether climate conditions could bring about more heat related deaths in any of the cities being monitored. It does this by considering several factors:

- Meteorological features of every site, and pollution levels;
- Structure of the city; and
- Demographic structure of the population.

Alert levels are on four levels, with 0 being the lowest:

- **Level 0:** No risk;
- **Level 1:** Low risk in the next 72 hours;
- **Level 2:** High risk in the next 24-48 hours; and
- **Level 3:** Higher risk in the next three working days, elderly population at risk.

The system creates a bulletin – some of the information is reserved for scientists and some of the information is for public dissemination and use.

On the health side, Dr Carlo Perucci, Director of the National Centre for Heat Waves, underlines that it isn’t possible to pinpoint in an individual at what level health problems are likely to occur. People react in different ways to heat, depending on genetic make-up, environmental conditions and lifestyle.

However, “Our studies convince me that we could prevent any deaths caused by extreme heat, if we can take the right precautions,” says Dr Perucci.

Concluding, Dr Marta Di Gennaro explains that the next step is to extend the project across the whole of Italy.



**Fifteen thousand people died in France, and 20,000 in Italy during the heat wave of 2003; the elderly and young are the most vulnerable**

photo: Getty Images

area of Luxembourg). This year has seen a resurgence. By mid-July, 19 people had lost their lives, 70,000 fires were recorded and an area of 140,000 hectares had already been burnt.

Certain areas of Europe are predicted to experience dryer summers. Countries that have not traditionally had to cope with hot, dry conditions leading to forest and brush fires may well be advised to revise procedures and start planning. Perhaps an attitude shift is required, with such events being accepted as more likely to become the norm, rather than the exception. When rivers have slowed to a trickle and reservoirs are low, extra consideration must be given to water supplies for firefighting.

But as well as drought, floods and storms are expected to increase.

As Bernardo de Bernadinis from Pavia's Civil Defence Department warns: "Drought and high temperatures could bring a period of solid rainfall. We subscribe to all the worries of the scientists. In 1994 catastrophic flooding in Piemonte followed a hot summer; the same happened in 2000."

Eastern Europe experienced some of the worst floods ever in 1997 and 2002. In the UK, the

WWF points to the flash floods in Boscastle, Cornwall (see CRJ Volume 1. Issue 1) and extreme floods in North Yorkshire in 2005: "Yet much of the South East of the country is currently suffering a serious water shortage."

In addition, glaciers in Europe are retreating, threatening the existence of the lakes that they feed. Snow is melting in the Alps, causing the risk of mudslides and floods. River levels in Italy are dwindling – with the river Po shrinking to its lowest levels for 90 years.

So concerned is the Italian Civil Defence Department about the implications of these developments, that it has started a public information campaign at national level to promote water conservancy with Italy's water agency.

As well as guaranteeing water supplies for human, agricultural and industrial use, it is hoped that the initiative will help to keep rivers clean during the summer when water levels are lower.

## Health effects

And the health effects that might face emergency services and planners? Obviously there are the general health implications of air pollution in times of heat waves, which are particularly serious for the very young and the elderly. Common causes of death include respiratory and cardiovascular disease, as well as heatstroke and dehydration. Some researchers believe that

climate change could allow an influx of serious diseases in areas that have not previously been affected. Water-borne diseases in flooded areas could also become more prevalent.

These are just a few of the most immediate consequences of a slight rise in temperature, consequences that will all affect the workings and duties of fire and civil protection forces.

However, as previously stated, this article does not look in depth at the impact of climate change in all countries around the world. It focuses on a geographical area that has traditionally experienced a stable climate, with environmental and weather disasters being the tragic exception, not the norm. If the changes of a few degrees in temperature can bring about any of the above effects in Europe, what are the effects likely to be in areas that are already no strangers to extremes in weather? And what measures can be taken to mitigate their effects?

Some lessons must be learned immediately. As Dr Lagadec is keen to emphasise, we should: "Never prepare for the last war." We must anticipate future threats.

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■ Sources, include: *Europe feels the heat, the power sector and extreme weather*, WWF PowerSwitch Campaign, [www.panda.org](http://www.panda.org); Dr Patrick Lagadec, [www.patricklagadec.net](http://www.patricklagadec.net); Giovanni Di Gaetano, Protezione Civile, *the Italian Civil Protection Journal*, [www.laprotezionecivile.com](http://www.laprotezionecivile.com)