

Forest fire related deaths in Greece: confirming what we already know¹

Gavriil Xanthopoulos²

Abstract

Forest fires are dangerous phenomena that can cause loss of life of firefighters and other citizens. Their death toll is relatively small, comparing for example to the number of lives lost in traffic accidents. However, fire related deaths are always dramatic and create strong emotions to the public. More important, they are a concern to all those working in fire management because, as a rule, most of these deaths can be avoided if the necessary knowledge exists and the necessary care is exercised.

This paper presents a number of forest fire related deaths of both firefighters and citizens that occurred in Greece in the last decades. The incidents are described briefly, providing the necessary information that leads to the basic conclusion of this work: the causes of each fatal accident are not unique to that case. They have been identified before in some other place and time, and they fall into broad categories for which warnings have been established in international literature. The question that has to be answered then is if the victims possessed, at the time of the accident, the necessary knowledge on how to avoid putting their life in danger. A negative answer to this question necessarily points to the ever-existing need to educate firefighters and the public, especially when the latter lives in wildland-urban interface areas, on what they should do, what they shouldn't, and which are the situations that shout "watch-out".

Introduction

Forest fires are dangerous phenomena that can cause loss of life of firefighters and other citizens. The death toll is usually relatively small, comparing for example to the number of lives lost in traffic accidents. However, fire related deaths are always dramatic and create strong emotions to the public. More important, they are a concern to all those working in fire management because, as a rule, most of these deaths can be avoided if the necessary knowledge exists and the necessary care is exercised.

The conditions under which a fire related death occurs are seemingly unique. However, careful study of numerous such tragic events around the world has revealed that most of them share some common characteristics. These characteristics have been identified, have become textbook knowledge and have helped save the lives of many firefighters who have learned the "thirteen situations that shout watch-out" and other similar lists of safety rules-to-remember.

¹ Title footnote style

² Author footnote style (use different footnote numbers for authors at different locations)

Greece is a country with Mediterranean climate so, as all such countries, faces a serious forest fire problem every summer. In the last three decades, this problem started worsening due to a number of reasons such as:

- Forest fuel build-up due to internal migration of people from the rural areas to the cities.
- Reduction of wood utilization for heating and cooking in the villages in favor of using alternative energy sources, such as electricity.
- Development of extensive wildland-urban interface (WUI) areas around the largest cities (Athens, Thessaloniki) and along the coast where Greeks and tourists choose to enjoy their vacations near the sea but also not far from the forest. Starting with a large fire in the high-class northern suburbs of Athens in 1981, fires in the WUI gradually became the major fire issue nearly every summer.

The new fire environment that combines the difficulties of fighting fires in WUI areas with increased fire potential in Greek forests due to fuel accumulation has resulted in a steep increase of property damage and loss of life, especially when compared to the low pre-1980s levels (Xanthopoulos 1988). This increase has become a significant concern for the people and often finds a place in the headline news. However, although large destructive fires and fatal accidents have attracted a lot of attention, there has been no systematic effort until now to record and analyze them in order to draw conclusions and learn from past mistakes. This paper is the beginning of such an effort. It presents briefly a number of incidents that resulted in forest fire related deaths of firefighters and other citizens that occurred in Greece in the last decades, and discusses the extent to which these events are similar to such fire disasters in other parts of the world. The objective is to shed light and to draw conclusions of value not only for the Greek readers but also for the international audience to which it is presented.

Forest fire related deaths in Greece

Deaths related to ground firefighting

The Greek Forest Service (GFS) had been responsible for firefighting until 1998. Then the responsibility was transferred to the Greek Fire Corps (GFC), which traditionally had been responsible for urban and industrial fires. This change affected the way in which firefighting is carried out and to some extent the characteristics of the fatal accidents with firefighters as victims.

Deaths of Greek Forest Service personnel

Until 1998, the personnel of the GFS was composed mainly of foresters, assistant foresters, forest guards, forest firefighters, and professional drivers, in total less than 4500 people. During the fire season, in the summer, about 5500 seasonal firefighters were hired every year. The system of hiring them did not always guarantee that they were suitable for the job since at various times social or even political criteria had been applied. All this personnel had little official training in firefighting but through the years accumulated a lot of experience. Before the 1970s,

people in the villages knew how to fight fire using handtools and agricultural equipment. They also took advantage of agricultural cultivations, such as vineyards and olive groves within or at the edge of forests and used fire to fight fire where they had the opportunity. With the help of the reduced fuel load, especially close to inhabited areas where biomass utilization for heating, cooking and construction, and consumption by grazing animals was quite intense, the personnel of the GFS with the aid of locals were able to extinguish most forest fires quite effectively. Knowledge of the topography, road network, local meteorology and vegetation distribution were their main advantages. These, combined with the use of indirect attack principles, compensated for the lack of specialized equipment. According to Kailidis (1990) in the 1950-1976 period there were no victims due to forest fires in Greece.

In 1971 the GFS started acquiring specialized firefighting trucks. In 1974 the first amphibian Canadair CL-215 water bomber was introduced. In spite of that, the total burned area started increasing after 1976. In response, the government gradually increased the number of ground and aerial means. Firefighting gradually changed. The involvement of local people in firefighting gradually decreased, partially due to their decreasing number and growing age, as young people left the villages for the cities, but also due to a changing mentality to “let the professionals do it, since they are paid for it”. Without good firefighting training, and with water available for firefighting from the trucks and from the air, the mainly seasonal personnel of the GFS turned to direct attack. The use of handtools was practically abandoned in the 1980s. These changes, in combination with the gradual increase of fuel loads that started in the 1970s, resulted in an ever-increasing size of total burned area in the country through the 1977-2000 period. The contribution to fire suppression of GFC forces, especially close to settlements, and of army units that were called in to help when fires ranged out of control, was not effective, as they had neither specialized training for forest firefighting nor any significant experience. Fires that rarely approached villages in the past because they were surrounded by cultivated fields, tree groves, vineyards and cleaned forest where dead woody fuels were being systematically removed for utilization, now reached the perimeter of villages and often ripped through their streets. The first signs of fires in the wildland-urban interface zones that had started being developed in the late 1970s also started appearing in the 1980s.

From 1977 on, forest fires in Greece started having victims on a more or less regular basis. However, only few of these victims were related to firefighting.

In 1978, during a fire in the forest of Tatoi near Athens, a soldier whose unit was participating in firefighting was killed when hit by the water drop of a Canadair CL-215 water bomber. According to an account of this accident, narrated to this author by a witness, the army unit was ordered to enter into the firefighting zone where the drops were being made, by a minister who was present in the area at the time, in spite of the objections of the GFS officer in charge.

In 1981, a young man who volunteered for firefighting was killed on the island of Rhodes while firefighting (Kailidis 1990).

In 1983, a GFC professional firefighter who participated in firefighting in an area of low shrubs with fine fuels (phrygana) received extensive burns and died. According to an account of this accident, narrated to the author twenty years later by GFC officers, he was surprised by the change in behavior and the quick spread of the fire in these flashy fuels.

In 1984, a soldier was killed during firefighting on Rodopi mountain in Northern Greece, and another one was seriously injured on the island of Rhodes.

In 1985 a forest guard was trapped during the large fire of Thassos island that lasted 7 days and burned 12000 ha. He chose to cross the fire front and enter into the black. He received serious burns but survived. Six other citizens died during that fire (Kailidis (1990)).

In 1988, one of the worst fire seasons in which 12 people died, the chief officer of the GFS office in Sperhiada, Central Greece, received serious burns when, according to descriptions provided to the author, the vehicle he was using for patrolling an intense fire was trapped on a forest road, in a V-shaped draw, with the fire coming from below.

On 26 July 1990 a fire in the area of Paleovarvasena, Pyrgos, Peloponnese killed two young seasonal firefighters. The fuel was mainly tall dry grass with few shrubs and sparse Aleppo pine (*Pinus halepensis*) trees. According to the account of a forester who worked at the GFS office of Pyrgos, the two firefighters reached the location in their firetruck. They left the firetruck on the forest road and went down the slope of 45-50 percent, from their truck towards the flank of the fast moving fire below them. They started hosing the flank when a change of wind direction, probably an aerodynamic effect of the movement of wind around the hill, spread the fire below and then around them, upslope towards the forest road. They were overpowered by the fire, abandoned the hose and run upslope towards the road but they did not have the chance to climb the last few steep meters to the road surface. The nozzle at the end of the hose was found about ten meters downslope from them, indicating that they did not have much time to run from the moment they decided to escape. When other firefighters arrived a few minutes later, the fire was burning their firetruck.

Deaths of Greek Fire Corps personnel

As mentioned earlier, the GFC took the responsibility for firefighting in May 1998. It was a political decision without serious scientific input and without careful planning. The GFC firefighters had little previous training on forest firefighting and their participation in such operations until then was mainly in support roles of the GFS personnel. Undertaking full responsibility for the first time was immediately followed by disaster. The fire season on 1998 was disastrous and claimed many victims including firefighters and other citizens.

On July 22, 1998, at 3 pm, a fire erupted in an Aleppo pine at the base of Hymettus mountain, next to the suburb of Kareas, at the east border of the city of Athens. It was fanned by a strong steady north wind called “meltemi” which occurs regularly in the summer in the eastern part of Greece. The fire started moving along the slope of the mountain that runs from the north to the south in that area. A firetruck and a command vehicle started moving on a forest road in the middle of the slope. Their movement was along the east flank of the fire that was burning on the slope below them with an intense front to the south. However, near the starting point of the fire, there exists a small canyon that has a west to east direction. As the fire reached the bottom of the canyon, to the surprise of the firefighters it started spreading as a crown fire up in the canyon, perpendicular to the general fire direction, in a clear demonstration of the so-called “chimney effect” (Figure 1).



Figure 1. A view of the Kareas fire on Hymettus mountain showing on the right the main fire moving to the south and on the left the head of the fire at the moment it reached the top of the canyon after moving nearly perpendicular to the direction of the main fire and the wind. (Source: Live broadcast of the fire progression scenes on the public NET TV channel).

The firefighters, fearing they might be cut-off by this finger turned back trying to get out of the area, towards the monastery of Saint John of Kareas. The command vehicle escaped but three firefighters and two volunteers in the firetruck stopped at exactly the V-point of the road in the center of the canyon. There, they stopped and turned the front of their truck towards the advancing fire in a position that they could move in either direction. According to one of the two volunteers, they started unreeling the hose to fight the fire. The driver of the truck left it joining the other two firefighters and the second volunteer. Exposed to the heat of the advancing fire in the canyon they soon had to abandon their effort. Unfortunately, instead of trying to escape on the road on either side of the V-point, or remaining in the cabin of their truck, they started climbing upslope probably trying to reach another road that exists higher on the slope, at a distance of approximately 200 m, in a direction parallel to the first one. With the fire behind them, they were soon overwhelmed as they were breathing the smoke and hot gasses channeled in the canyon. Their bodies were found on the slope approximately 100-150 m from the truck. The first volunteer who had remained on the road near the truck, left it and running on the road passed through the smoke and reached the unburned forest at a distance of less than 150 m from the truck (Figure 2). The firetruck suffered little damage (Figure 3). One of the back tires caught on fire when a nearby tree started burning. The tank had more than 1 ton of water. The cabin was nearly intact. After changing the tire, it was possible to drive it to the station. It can be assumed with some certainty that if the four victims had stayed in the truck they would have survived (Xanthopoulos 1999). Furthermore, they could have escaped if they were trained to anticipate the fire behavior and they had acted like the surviving volunteer, instead of climbing up the slope with the fire below them.



Figure 2. The site of the fatality at Kareas, photographed in 2002 from a point close to where one of the bodies was found. The box-canyon topography is evident. On the left is the monument built in memory of the victims at the spot where the firefighters had parked their firetruck. The tree stand to the right shows where the flank of the fire was stopped, a distance of roughly 150 m from the firetruck. The surviving trees on the left side, less than 100 m from the firetruck location in the direction from which the firefighter came, are an indication that fire intensity there was relatively low.



Figure 3. The firetruck parked in a position facing the fire, with ability to move to the left and to the right. Only one of the rear tires burned. Source: SKAI TV news.

On July 15, 1999, two young firefighters were killed when their firetruck got off the road and fell in a large natural cave on Hymettus mountain near Athens. A third firefighter, managed to open the door and jump out of the truck before it fell in the cave. She escaped unharmed.

On July 28, 1999, in the evening, a fire ignited in the area of Cape Melanios on the island of Chios. It could not be controlled before dark. The forces fighting the fire in the night included a ground crew with hand tools. Some members of the seasonal crew had an experience of up to five years in forest firefighting but the GFC officer in charge did not have much experience in fighting fire without hose. The fire was spreading in phryganic vegetation, consisting of small low shrubs, mainly *Sarcopoterium spinosum*, which is known as a flashy fuel. The crew was sent downslope to extinguish part of the perimeter of the fire that appeared calm at the moment. Then, a sudden wind change, in combination with the slope and the flashy nature of the fuels, created an upslope fire run that surprised them. The crew retreated and escaped. However, a female 27 year-old firefighter, who had been educated as assistant-forester and had later been trained in firefighting accumulating a four-year experience, suddenly collapsed as they were retreating. The reasons for this remained unclear. Another young firefighter and the GFC officer in charge paused to help her. All three were caught by the flames. The young firefighter suffered extensive burns (>60% of his body) and died a week later in the hospital. The GFC officer, escaped with intense burns over 40% of his body, and managed to survive after a long treatment in the hospital (Xanthopoulos 2000a).

In September 1999, one civilian driver of a water-truck belonging to the town of Poros in Peloponnese, got killed when his truck fell-off a forest road. He had just refilled Fire Service fire trucks that were fighting a small wildfire and was returning to his base (Xanthopoulos 2000a).

On June 14, 2000, a GFC officer, commander of the GFC Fire Service in Sparta, Peloponnese, was injured by a large rock that came down a burning slope, while coordinating the suppression of a large fire on Taygetos mountain near Sparta. He was taken to a hospital where he died 37 days later.

Deaths related to aerial firefighting

The fleet of national aerial means currently includes Canadair CL-215, Canadair CL-415, PZL M-18 Dromader. These are operated by the military Air Force on behalf of the firefighting organizations. In the past (1984 to 2005) three C-130 aircraft were used for retardant delivery through a MAFFS system. In the mid 1990s (1994-1998) Army helicopters (Chinook and UH-1H “Huey”) were used for carrying firefighting crews and making water drops. In 1993 and from 1999 until now, a fleet of contracted helicopters of various types (Erickson S-64 «Air-Crane», MIL MI-26, Kamov KA-32, etc.) has been used for firefighting. In the last few years the GFC also operates its own fleet of two light command helicopters and a heavier SUPER PUMA mainly used for personnel transport.

As aerial firefighting, which is inherently a risky operation, kept growing in Greece it was inevitable that accidents would happen. Five CL-215 pilots were killed between 1973 and 1990. Four CL-215's were destroyed during the 1980s. Two more pilots were killed during firefighting close to the village Ano Rodini, near Patras,

Peloponnese in 1993, and another two on July 15, 2000 on Pelion mountain in central Greece (Xanthopoulos 2000b).

The exact number of pilot losses with the PZL single-engine single-pilot planes could not be determined, as some of these losses occurred during aerial spraying for agricultural purposes (until the late 1990s when the practice was stopped). However, the number is more than five, with the most recent losses being on August 7, 2000 during firefighting on the island of Corfu, and on August 25, 2003 when a patrolling PZL tried to perform initial attack on a fire that was just starting.

Three Army pilots and seven firefighters forming a handcrew were killed in 1994 in the prefecture of Kavala in northern Greece when their UH-1H "Huey" helicopter hit power lines on its way back from a fire. The accident happened at dusk because the pilot had waited to pick-up the last persons of the returning crew and took-off for the base at a time that he should have already been there.

Deaths of citizens not involved in fire suppression

As mentioned earlier, from 1950 to 1976 there was no recorded loss of human life due to forest fires. In 1977, however, the death of a nun trapped by a wildfire in a monastery on Mount Parnassos signalled the beginning of a new era in which the loss of human life due to wildfires became quite common. More than thirty civilian deaths were recorded in the 1980s, nine of them in 1985 and 12 in 1988, two of the worst fire years.

There exists no detailed record of all civilian deaths that occurred due to fire in the 1990s and 2000s. However, some characteristic examples are mentioned below.

In the 1990s the worst disaster was the death of thirteen people on the island of Ikaria in the NE part of the Aegean sea. The fire started at 14:30 on July 30, 1993. There were two fire starts north of the town of Agios Kirikos. They were later attributed to arson. According to witnesses, it took the weak firefighting forces on the island more than an hour to arrive on the scene. The wind was blowing at about 8 Beaufort scale force (the usual NE wind called "meltemi" that blows at this time of the year in the Aegean). The fire soon reached the settlements Glaredes and Kountouma where houses were intermixed with forest and agricultural vegetation. People tried to leave in panic. On one occasion, five people perished when they tried to flee with their car. In the smoke they had a collision. They were caught by the smoke and flames as they were trying to leave the damaged car. In another case, three young men tried to help three old people to evacuate their home. They were all caught in the open by the flames and perished. The three young men are considered as heroes in Ikaria and a monument has been built to commemorate their sacrifice. However, the outcome might have been different if they had all remained in a house rather than trying to flee. The final toll was 13 people dead, many more injured, 35 destroyed houses, and 400 ha of pine forest and agricultural land burned.

On July 4, 1998, on a high fire danger day during which more than 15000 ha burned in south Greece, a woman was killed by a fast moving fire on Salamina island near Piraeus. She had fled her home in panic and the fire caught her in the open.

On August 5, 1998, a 7500 ha fire that had started on August 2, killed a 67-year old man who was trying to fill his car with some of his belongings and evacuate (Xanthopoulos 2002). He was found on the ground next to the car, victim of inhaling smoke and hot gases. His wife who had found refuge in a neighbour's home survived.

Another disastrous event occurred on August 24, 2000 near the Greek-Albanian border. A fire had been burning for many days within Albania. On that day, the wind, coming from the north, picked up strength and reached a velocity of 7 degrees on the Beaufort scale. The fire accelerated, crossed the border and entered Greece in a mountainous area that is generally moist and where the forest ecosystems are less fire prone than in the rest of the country. However, in that extremely dry year, the forest stands were as dry as they had ever been. Entering a long wide valley near the village of Haraugi the fire spread over a distance of nearly 17 km within four hours, burning mainly dense broadleaved vegetation. Many small villages in the shrubby oak forests were soon surrounded by fire. Most people fled or were evacuated by the police and the GFC but some of them did not make it or stayed to protect their homes and perished. By the next morning, seven people were dead and tens of homes were destroyed. The fire continued for three more days, finally burning about 8000 ha. The final death toll reached eleven people, all of them older than 67 years old.

In July 7, 2004, a wildland-urban interface fire in the Thrakomakedones suburb of Athens, at the foothills of mount Parnis, that burned Aleppo pine stands mixed with homes, damaged many homes and claimed the life of a 74-year old man who had left his home trying to escape the fire, He was caught by the fire and died due to smoke inhalation, 200 m from his home. His house did not suffer any significant damage.

On August 22, 2006 a large lightning-caused fire in the peninsula of Kassandra in Halkidiki, northern Greece, burned through a wildland-urban interface area with a strong tourist development. Thousands of people, including a large proportion of tourists, had to leave their homes and hotels moving towards the sea. Evacuation in some cases was performed using boats since the fire had blocked the main road connecting the peninsula with the rest of Halkidiki. In one incident, obviously in a state of panic, a German tourist trying to get on a boat fell in the sea and drowned, in front of his family.

In addition to the deaths documented above, it should be mentioned that nearly every year a small number of people working in agriculture, usually one to three, die accidentally in separate incidents, while trying to burn the stubble remaining after picking the crop in their cultivated wheat fields. Typically, old people who have been practicing this type of burning every year e throughout their life are the victims. These accidents appear to be the result of a combination of over-confidence, a body getting old and less agile and the potential of these fine fuels to respond quickly to changing wind surprising the victims who do not have time to react.

Discussion

The information above, although skeletal and in some cases relatively unclear, makes it easy to identify a number of factors that played a significant role for the tragic evolution of the incident. The conditions that have led to the accidents are generally similar to those identified in other parts of the world, such as the USA and Australia, where numerous studies including statistical analyses on quite large databases have been carried out.

In regard to the deaths of firefighters, it must be said that they are relatively few considering the characteristics of fires in the Mediterranean environment of Greece and the fact that many poorly trained seasonal employees have been used through the

years for manning the firefighting mechanism. This low death incidence rate can be attributed, to a large extent, to the existence of a good road network and to the fact that most firefighting is done from roads or at a short distance from them, using water from firetrucks to extinguish the fire. Furthermore, the forests are generally interspersed with villages and agricultural cultivations that offer areas of retreat in case of extreme fire behavior.

Flashy fuels have been the cause of some of the firefighting accidents as they respond very quickly to changes of the environmental conditions (wind, topography, relative humidity). However, the accident that left the most vivid impression to the public was the one in the area of Kareas, on Hymettus mountain, because it received heavy coverage by the Mass Media due to the proximity of the area to Athens, but also due to being a proof that the GFC firefighters lacked in training and experience for wildfire firefighting, a responsibility assigned to them with little preparation two months earlier. For experienced fire experts this incident was a textbook demonstration of the grave danger to which firefighters are exposed when fighting fire in canyons (Viegas and Pita 2004).

On the other hand, the death toll in accidents related to aerial firefighting is much higher, especially considering the small number of people involved in it. Probable causes of these accidents are: bending the rules, as in the case of the UH-1H helicopter crash in Kavala, excessive pilot self-confidence, and in some occasions poor aircraft maintenance.

The firefighter death toll in the first three years that the GFC carried the responsibility for firefighting made them organize training seminars for its personnel. However, in addition to that, and taking advantage of the especially large fleet of aerial means it has available every summer after 1999, the GFC firefighting doctrine, as seen in practice, appears to be: “massive aerial attack first; active ground firefighting later, after the fire has been, more or less, controlled from the air”. This method has worked quite well in the relatively easy fire seasons of 2001 – 2005. It showed its limitations in August 2006 when huge aerial resources were not available on time to fight the fires in Kassandra, Halkidiki and Mani, Peloponnese, and the two fires became major disasters. It may lead to serious problems in an extended difficult fire season. Furthermore, the excessive use of aerial means in a bad fire season may lead to more disasters and losses of pilots.

In regard to civilian deaths, their causes are very similar to those noted in other countries around the world. Flashy fuels are the cause of many deaths, especially related to stubble burning. Leaving home and trying to escape in panic becomes another major cause of death when people find themselves in the smoke of the advancing fire. It should be noted that houses in Greece are generally built with non-flammable materials so, as a rule, it would make sense to stay in them during the passage of the fire front instead of attempting a risky escape. It is quite clear that an effort is needed for educating people on how to prepare for the case of a fire close to their home when it is built close or inside a forest, and what to do to survive and save their home when a fire actually occurs.

Finally, it must be stressed that the information on past fire incidents involving deaths, injuries or near-hits in Greece is sketchy. The results of the investigations that follow such events are never publicized. Furthermore, even if one tries to obtain the documents through legal procedures the confidence on the findings can be quite weak. The reason is that the people performing the investigation usually do not

possess specialized knowledge on fire behavior etc. Also, there is often an effort to cover-up the true responsibilities and mistakes protecting specific individuals who were probably at fault because of the general inadequacy of their organization (e.g. lacking training, clear guidelines, appropriate dependable tools, etc.). There is little effort to this day devoted to investigation of the accidents in order to draw conclusions and guide future training. On the contrary, declaring the victims as heroes, building monuments for them and providing some compensation to their families appears to be the preferred approach.

Conclusions

The incidents described here, provide the necessary information that leads to the basic conclusion of this work: the causes of each fatal accident are not unique to that case. They have been identified before in some other place and time, and they fall into broad categories for which warnings have been established in international literature. The question that has to be answered then is if the victims possessed, at the time of the accident, the necessary knowledge on how to avoid putting their life in danger. A negative answer to this question necessarily highlights the ever-existing need to educate firefighters and the public, especially when the latter lives in wildland-urban interface areas, on what they should do, what they shouldn't, and which are the situations that shout "watch-out".

Acknowledgements

This paper is based on work performed for the SCIER research project, which is funded by the European Commission, DG Research, 6th Framework Programme (Contract: IST-5-035164). This support is gratefully acknowledged.

References

- Kailidis, Demetrios. 1990. **Forest Fires**. 3rd ed. Thessaloniki, Greece. Giahoudi-Giapouli publishers. 510 p. (in Greek).
- Viegas Domingos Xavier; Pita Luis Paulo. 2004. **Fire spread in canyons**. International Journal of Wildland Fire 13(3) 253–274.
- Xanthopoulos, Gavriil. 1988. **Greek forest fires and property damage: A brief history**. In: Fischer, William C.; Arno, Stephen F.; compilers. Proceedings of the Symposium and Workshop on "Protecting People and Homes from Wildfire in the Interior West"; 1987 October 6-8, Missoula, Montana, USA. Gen. Tech. Rep. INT-251. Ogden, UT: Intermountain Research Station, Forest Service, U.S. Department of Agriculture; 199-200.
- Xanthopoulos, Gavriil. 1999. **The 1998 forest fire season in Greece: A forest fire expert's account**. International Forest Fire News (ECE/FAO) 20: 57-60.
- Xanthopoulos, Gavriil. 2000a. **Greece: the 1999 forest fire season**. International Forest Fire News (ECE/FAO) 22: 25-28.
- Xanthopoulos, Gavriil. 2000b. **Fire situation in Greece**. International Forest Fire News (ECE/FAO) 23: 76-84.
- Xanthopoulos, Gavriil. 2002. **The forest fires of 1995 and 1998 on Penteli mountain**. In: Xanthopoulos, Gavriil, editor. Proceedings of the International Workshop on "Improving

Session No.—part of the title—authors' last names

Dispatching for Forest Fire Control"; 2001 December 6-8; Chania, Greece.
Mediterranean Agronomic Institute of Chania, Chania, Greece; 85-94.