

# Wildfires in Mediterranean countries and Climate Change

<b>Title</b>	Wildfires in Mediterranean countries and Climate Change
<b>content/Key words</b>	Wildfires (or wildland fires), Forest fires, Mediterranean Ecosystems, Fire Ecology, fire triangle, fire regime, fire danger map, Climate Change, Natural Disasters
<b>Description</b>	<p>The Mediterranean region, due to its climate, has greatly suffered from wildland fires during the last 10.000 years or more. Climate Change is affecting the occurrence of wildfires making the negative effects even more adverse.</p> <p>Wildfires and Climate Change are complex and may be misinterpreted. On the other hand, wildfires, in the mass media in Greece are a lot of times referred wrongly as ecological disasters (although they could cause human disasters). <b>It is important for citizens to understand the basic ecological processes of wildfires and get prepared for the future.</b></p> <p>In order to clarify the impact of Climate Change in the occurrence of wildfires in the Mediterranean Ecosystems of our countries (Greece, Croatia, Italy, France), we should <b>distinguish</b> the <b>natural fire-cycles</b> from the current fire-regimes which are mostly affected by human activities. During the last centuries <b>humans caused much more wildfires</b>, either <b>on purpose</b> or by <b>negligence</b>. Climate Change intensifies the fire regime even more. <b>Fire regime</b> is the <u>spatiotemporal expression of multiple fires that is governed by the combined effects of climate, fuel properties and ignition frequency.</u></p> <p>Some <b>basic principles of Fire Ecology</b> can be summarized as follows:</p> <ul style="list-style-type: none"> <li>- Wild fires consist a natural phenomenon in Mediterranean Ecosystems</li> <li>- Mediterranean Ecosystems have been shaped by and adapted to the occurrence of fire.</li> <li>- Most, of the Mediterranean plant species, have developed mechanisms that help them to cope with wildfires.</li> </ul> <p>For these reasons amongst others, wildfires in the Mediterranean ecosystems, in most of the cases, should not be referred as ecological disasters but as <b>disturbances</b>.</p> <p>However, in other types of ecosystems, such as mountainous and high-altitude ones, tree species are not adapted to the occurrence of fire and in these cases <b>an ecological disaster may occur</b>.</p> <p>Furthermore, <b>Climate Change poses a serious threat and makes especially the Mediterranean and mountain ecosystems more</b></p>

**vulnerable.**

In order for students to understand the basic mechanisms of wildfires it is important to start from the 3 aspects of the **fire triangle (oxygen, fuel, heat)** which are **natural** (and which represent the necessary conditions for the start and spreading of a wildfire) and **differentiate them from the causes**, that nowadays are usually man-induced (although natural causes still exist), and in fact represent the ignition factor of the fire (the first sparkle).

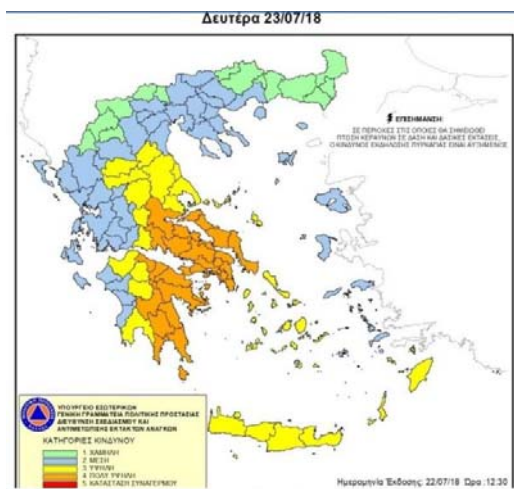
Then it is easy to link the aspects of the fire triangle with the **characteristics of the Mediterranean Climate** and with specific weather & soil conditions (**hot and dry summer, heat waves, droughts, absence of rainfalls during summer, dry thunderstorms, strong winds**, etc.) which lead to the drying of vegetation and the accumulation of flammable biomass and need only a sparkle for the wildfire to burst. The favorable conditions for the ignition of a wildfire are usually represented graphically by **fire danger maps** (Image 1). In Greece the agency that issues daily fire danger maps is the General Secretariat for Civil Protection (<https://www.civilprotection.gr/en/daily-fire-prediction-map>).

**Climate change affects** directly or indirectly all 3 aspects of **the fire triangle plus the ignition factor when it is related to lightnings or thunderstorms**. As a result, Climate Change affects greatly the fire regime and especially its frequency, intensity, severity, season, pattern and areal extent (including the geographical distribution) of the wildfires.

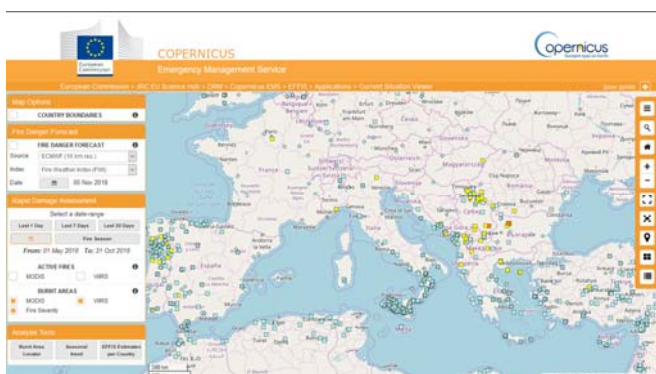
On the other hand, **the adverse effects of wildfires have a significant impact on the further intensification of the Greenhouse Effect** as well as on the **worsening of Climate Change**. The mechanisms involve, mainly the release to the atmosphere of big volumes of CO<sub>2</sub> and heat, as well as the disruption of the assimilation of CO<sub>2</sub> through photosynthesis since plants die. So, there is a positive feedback mechanism which continuously worsens the situation.

Visual material of the initiation of the **catastrophic wildfire of Eastern Attica in 23rd of July 2018 in which 100 people died** ([https://www.youtube.com/watch?v=MokHB\\_1ynY](https://www.youtube.com/watch?v=MokHB_1ynY)) could be utilized to demonstrate the speed of fire-spreading under prevailing very strong winds. The preliminary scientific report of the University of Athens points out the extreme weather conditions during the tragic incident ([https://www.researchgate.net/profile/Stavros\\_Dafis/publication/326672342\\_The\\_July\\_2018\\_Attica\\_wildfires\\_Scientific\\_report\\_v11/links/5b5c9efb0f7e9bc79a6c4682/The-July-2018-Attica-wildfires-Scientific-report-v11.pdf](https://www.researchgate.net/profile/Stavros_Dafis/publication/326672342_The_July_2018_Attica_wildfires_Scientific_report_v11/links/5b5c9efb0f7e9bc79a6c4682/The-July-2018-Attica-wildfires-Scientific-report-v11.pdf)).

	<p>At the European level, the European Forest Fire Information System (EFFIS), has developed a very powerful on-line tool with several applications (<a href="http://effis.jrc.ec.europa.eu/applications/">http://effis.jrc.ec.europa.eu/applications/</a>) which support the services in charge of the protection of forests against fires in the EU countries and provide the European Commission services and the European Parliament with updated and reliable information on wildland fires in Europe (Image 2).</p> <p>The educational material entitled: “Forest Fires - landscape restoration” (<a href="http://www.kpea.gr/files/forest_fires/2013_Fylladio%20Pyrkagiwn_final.pdf">http://www.kpea.gr/files/forest_fires/2013_Fylladio%20Pyrkagiwn_final.pdf</a>) gives pupils and teachers a useful guide to study wildfires.</p>
<p><b>Link to a national support by country</b></p>	<p>Fr : <a href="https://jalonedit.unice.fr/enjeux-cote-azur/cours/partie_5/les-feux-de-forets-en-region-mediterraneenne-et-sur-la-cote-d2019azur">https://jalonedit.unice.fr/enjeux-cote-azur/cours/partie_5/les-feux-de-forets-en-region-mediterraneenne-et-sur-la-cote-d2019azur</a></p> <p>IT :</p> <p>GR : <a href="https://www.wwf.gr/enviromental-education/env-edu-forests">https://www.wwf.gr/enviromental-education/env-edu-forests</a>  <a href="https://www.newsbomb.gr/tags/tag/114814/fwtia-twra-online">https://www.newsbomb.gr/tags/tag/114814/fwtia-twra-online</a></p> <p>CR :</p> <p>EN : <a href="http://www.fao.org/forestry/40319-06791969d1427714a896b8faeee2aa501.pdf">http://www.fao.org/forestry/40319-06791969d1427714a896b8faeee2aa501.pdf</a></p>
<p><b>Links to activity/project sheets</b></p>	<p>sheet n° and name</p> <p><b>N: “Forest fires: a burning issue!”</b></p>



**Image 1:** Fire danger map of the 23<sup>rd</sup> July 2018 when the catastrophic fire in East Attica caused 100 deaths.



**Image 2:** Screenshot of the EFFIS tool