METHANE AND OZONE CONDITIONALITY OF THE MASS FIRES

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ABSTRACT

The mass fires at the Earth's surface are caused by both natural, and anthropogenic factors. Natural – the oxidation and decomposition of organic matter which is followed by allocation of energy at the complicated heat exchange, dry thunderstorms, solar radiation, a volcanic lava and meteors. Anthropogenic, including, along roads and settlements – from glass and other materials concentrating solar radiation or from the chemical reactions happening to them, stubs and also ritual. In Northern and Central Europe, moisture of Atlantic and a lawn low-growing grass preserves against growth of the fires that evaporates moisture many times less, than high wild-growing in the east of the continent.

Allocating the abnormal maintenance (concentration) of one of factors at a background condition of the others it is possible to estimate its regional importance for emergence growth of the fires. It turned out that ignitions along highways and in mountains are most characteristic, Massawa - in zones of the increased concentration of methane and other flammable substances (essential oils) at the magnetized breaks of earth crust. The role of weather and solar radiation for efficiency of ignitions increases at reduction of humidity of air, especially it is shown in mountain conditions and in ozone holes where the contribution of high-energy ultra-violet radiation many times increases. It is reached by concentration of the ultra-violet site of a rainbow by atmospheric magnifying glasses (thermo-optical effect) or the combined fields of several reflections of ultraviolet ("sunbeams", from drops of water or crystals of ice).

KEYWORDS: *fires, natural gas-methane, low, high grass, ozone, solar radiation ultraviolet, "sunbeams", temperature, relative humidity.*

1. Introduction.

Natural self-heating of materials are caused by microbiological and chemical processes. Further natural heating is connected with the oxidation and decomposition of organic matter which is followed by energy allocation. In the conditions of heat exchange difficulty (thermal insulation, prevention of demolition of heat) acceleration of reactions of self-heating can begin, up to achievement of temperature (*t℃*) spontaneous ignition, emergence of ardent burning [1]. Catalysts of self-ignitions are also CH_4 and dry thunderstorms, solar radiation, especially at deficiency O_3 [2], a volcanic lava and meteors, anthropogenic factors: sparks, stubs, splinters of glass and polyethylene ware - any subject capable to concentrate a light stream or it to heat (to complicate heat exchange) (fig. 1). Data on *t℃* self-ignitions of often found substances are provided in tab.1.

Table 1

Ratio between *t°C* and J, J number at various warmings up of objects [3-7].

t°C	material	*J(t°C)*	*J(t°C)/ J(0°C)*	*J(t°C)/ J(30°C)*	*J(t°C)/ J(50°C)*
0		316			
10		364	1,2		
30		479	1,5		
50		618	2,0	1,3	
>70	hay	786	2,5	1,6	1,3
80	felt	882	2,8	1,8	1,4
120	cotton, mouldering wood	1355	4,3	2,8	2,2
≥135	coniferous forest laying	1573	5,0	3,3	2,5
140	peat	1652	5,2	3,4	2,7
≥164	air	2071	6,6	4,3	3,3
180-230	rubber, rubber, oils on a radio basis	2391	7,6	5,0	3,9
205	foliage, needles	2964	9,4	6,2	4,8
230	paper, vegetable oils	3634	11,5	7,6	5,9
260	birch bark	4581	14,5	9,6	7,4
466	propane	16924	53,6	35,3	27,4
537	methane	24426	77,4	51,0	39,5
605	carbon monoxide	33718	106,8	70,4	54,5

From literature it is known that the fires are characteristic of haystacks, swamps, dumps, ground concentration *of* CH_4 and essential oils and also zones of anomalies of maintenance O_3 as reduction of thickness of an ozone layer for 20% corresponds to ≈40% to increase in a stream of the ultra-violet radiation *(UF)*, to growth of a contribution of a stream of radiation in a strip the 280-320th from 2-3% to 5%, with height the ionizing radiation doubles on every 1500 m, the intensity *of UF* (320-400th) doubles. Not a just insignificant part of solar energy doubles that in addition heats Earth, and photons that possess sufficient energy for destruction of chemical bonds with allocation of heat, for example, destruction of molecules of ground O_3 [7-9].

In the dry, grown poor by O_3 atmosphere even of one-two reflections of sunlight ("sunbeams") can be enough for spontaneous ignition, especially "hares" from *UF* of a part of a rainbow (tab. 1). Out of the zones sated *with UF* the self-ignition requires long coincidence of spots of light from several, and even sets of reflections of solar radiation (that is improbable).

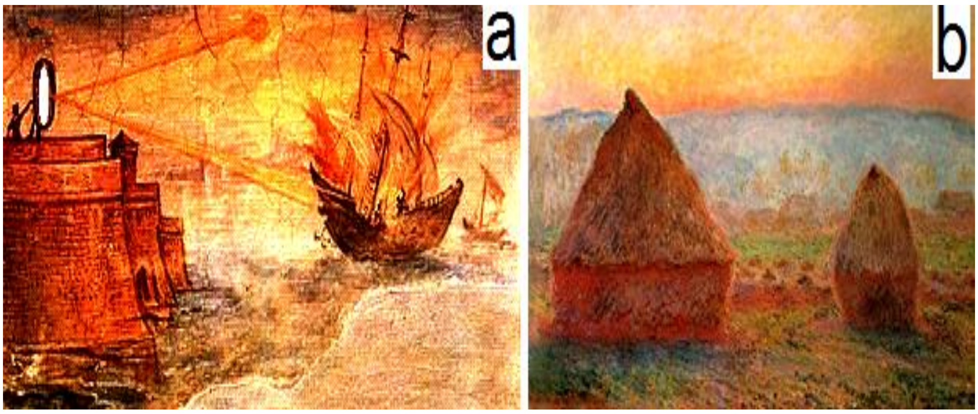

Fig. 1. a – Archimedes's mirror is used to burn the Roman ships. Giulio Pariji's (Giulio Parigi) [10] picture, b - Claude Monet, "Haystacks in Zhiverni, the Sunset" [11].

In the list of the analyzed materials satellite maps of the fires [12], concentration of CH_4 on 681.3hPa (≈3km) the *AIRs AQUA* artificial satellite radiometer for 2005-2010, deviation from normal of the general maintenance of O_3 in the thickness of the atmosphere [13], magnetic anomalies [14.15] and meteorological (meteo) data [16]. For assessment of regional fire hazard selected situations with an abnormal condition of one of factors at the background level of the others. Significantly it in the course of expectation-preparation-prevention of mass ignitions. For internal microbiological self-heating weeks, for transition from self-heating before spontaneous ignition – hours, for the forecast of an intensification of external "factors" (ozone holes, dry thunderstorms, positive anomalies of CH_4) - only a few day, and even hours, for earthquakes – weeks are required [17.18].

2. Anthropogenic ignitions the Canary Islands.

The fires dozens square kilometers in size with evacuation of thousands of people covering the volcanic Canary Islands were caused in recent years not by a volcanic lava, but people:

31/07/2007 "the arson was made by the forester who was afraid of dismissal" [19];

06/08/2016 "the tourist from Germany an arson toilet paper that provoked wildfires" [20];

in August, 2019 "The local violated safety measures during the welding works then sparks provoked ignition" [21] (fig. 2).

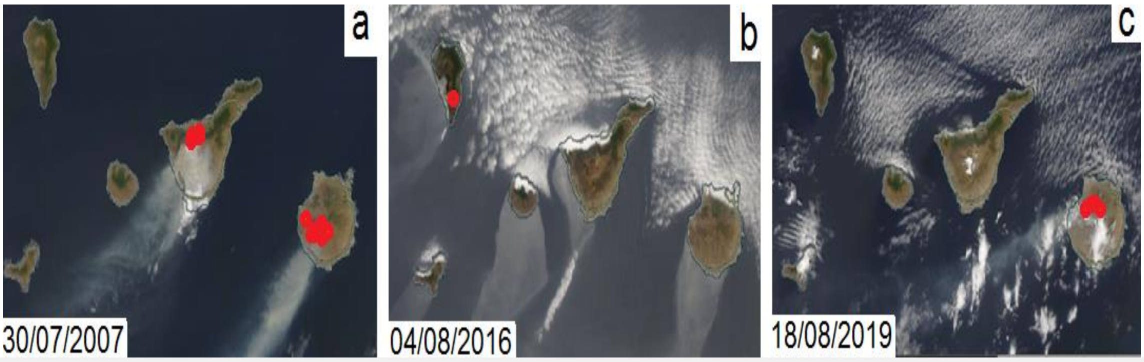

Fig. 2. a-c - the anthropogenic fires on the Canary Islands in 2007, 2016, 2019.

3. Natural ignitions from a technogenic and anthropogenic component

Technogenic component.

The natural fires from a technogenic component tracer highways of the roadside with a dry grass and a bush (sparks from the cars, including the flown-away stones, stubs, paper, rubber, roadside dumps, traditions of agriculture or cults, picnics). In the spring the fires trace highways along the western, east and northeast coast of North Korea and also border between the Korean states (fig. 3,a-c), in the north of South Korea - along the west bank and further on the South on the center of the peninsula (fig. 3,d). Not all roads "light up" synchronously, it is connected with decontamination of CH_4 when thawing soil, feature grassy a cover, existence of dry bushes, an exposition, garbage disposal terms, rituals, etc.

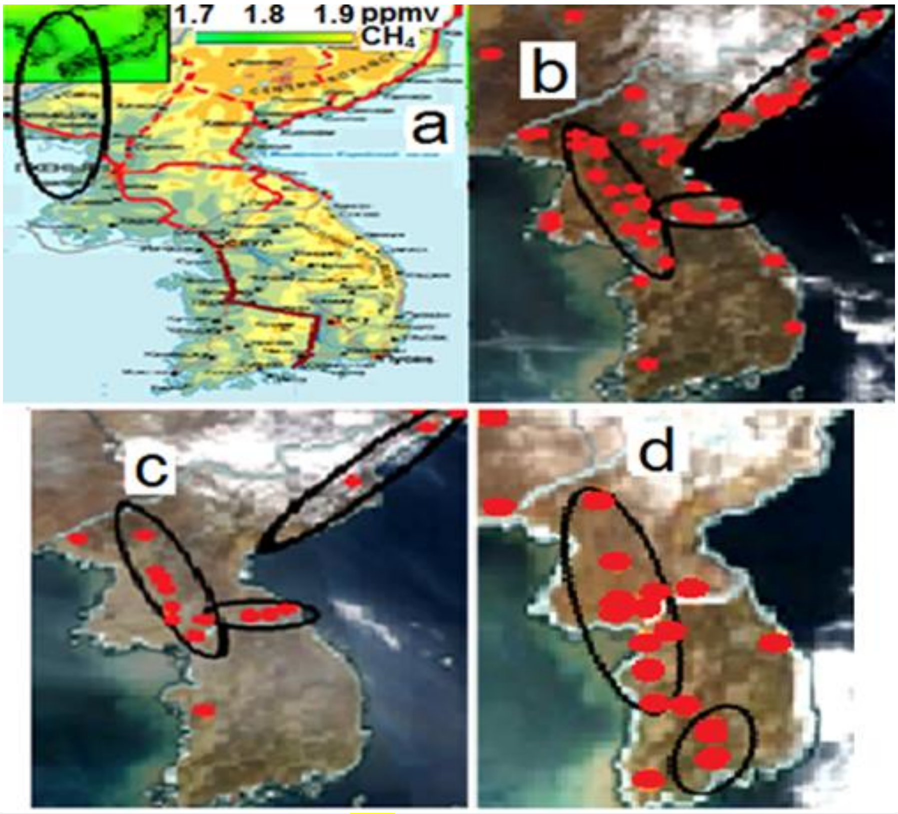

Fig. 3. The map of roads on the Korean peninsula [22] (a). On insert concentration of CH_4 30÷31/03/2005. Seats of fire 29/03/2005 (b), 30/03/2005 (c) and 10/03/2013 (d) (seats of fire for visualization are increased in comparison with initial; sizes of concentration of CH_4 on satellite maps permission ≈50km level on orders "pointed" surges in its concentration over swamps, breaks of earth crust). In ellipses the fires, the tracer allocated highways with fig. a.

Strip of ignitions with N-W on S-E of ≈400km traces the highway through Bosnia and Herzegovina. Further the fires last along roads to Macedonia and Albania, single ignition on the route to Belgrade (fig. 4).

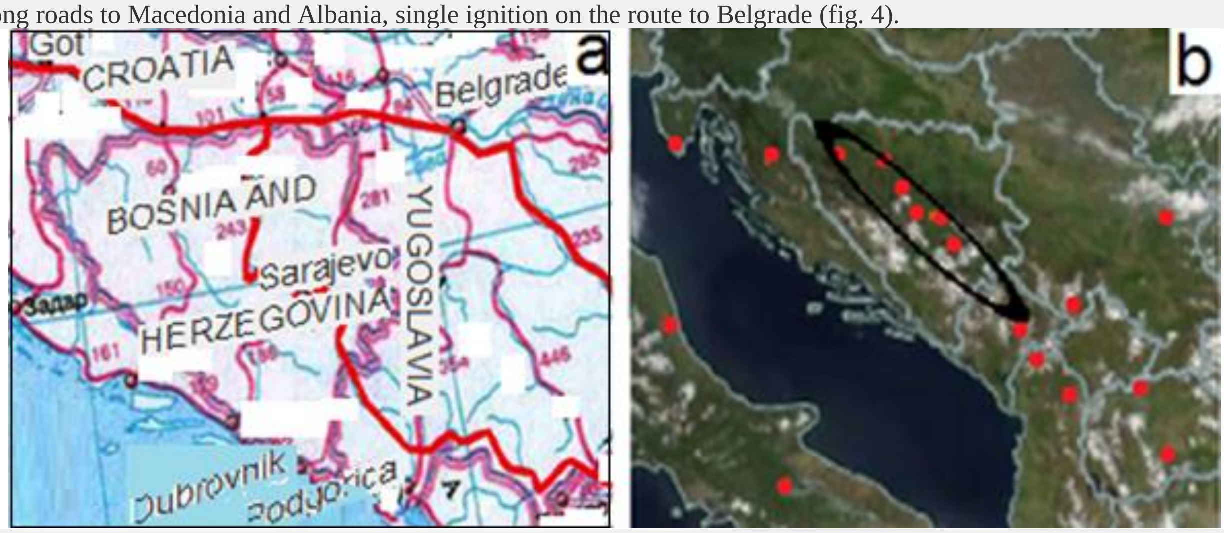

Fig. 4. The map of roads in the Balkans (a) [23], the fires 21/04/2007 (b).

Apparently, "garbage" genesis of the spring fires along the road from the Russian Kaliningrad to Kaunas (fig. 5), from Hamburg to Berlin and further to Prague (fig. 6,*a*), from Benelux countries through the Alps to Milan (fig. 6,b), and the southern section of the road from Marseille to Paris (fig. 6,c). These ignitions, as a rule, are limited in one afternoon (not peat bogs and the woods, but a roadside grass and dumps burn).

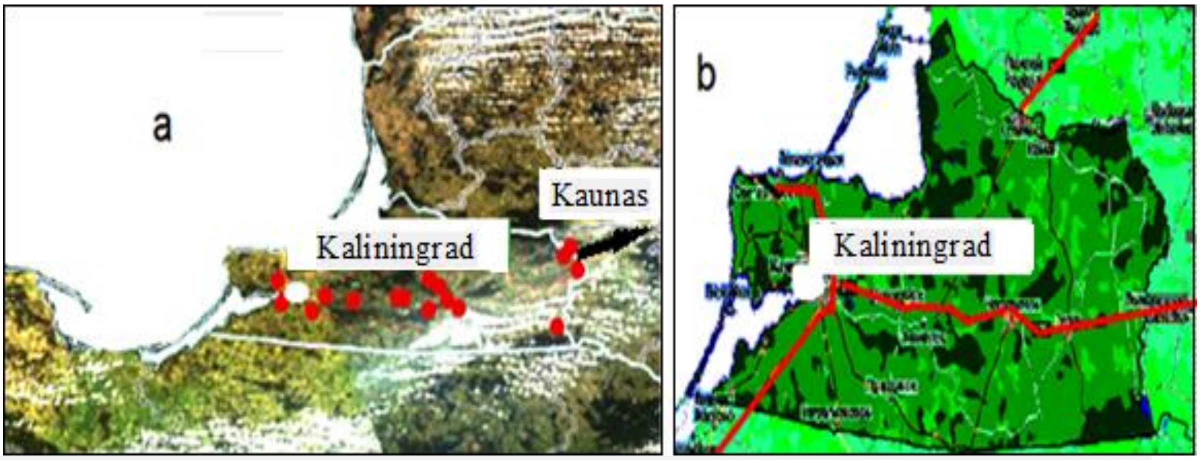

Fig. 5. The fires in the Kaliningrad region 05/05/2013 (a), the map of roads, a red background – generalized (b).

Fig. 6. a - the fires in Germany 22/05/2013; b – the fires along the road from Benelux countries to Milan 27/03/2017; c – the fires on the road from Marseille to Paris 19/02/2019.

In the spring of ignition trace the road from Volgograd to Rostov-on to Don, from the Black Sea to Makhachkala along the Foothills of North Caucasus and further along the Caspian Sea to the delta of Volga. The fires along the Lower Volga are dated not for the highway that on the west bank, and to the dry, in the spring not flooded sedge and a cane of the Volga floodplain (fig. 7).

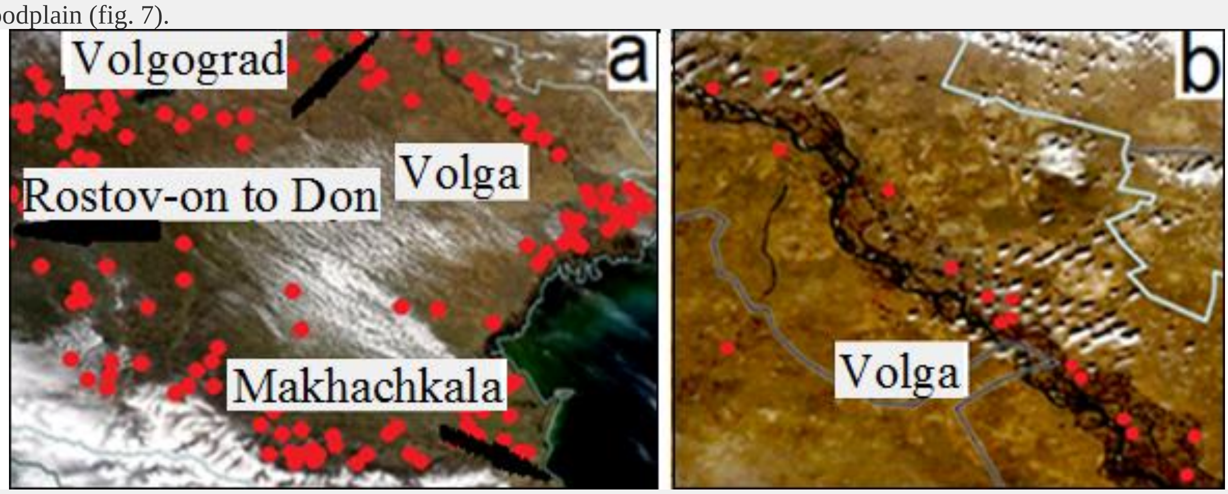

Fig. 7. The fires in the Southern Federal District 31/03/2007 (a), the increased fragment (b).

In Algeria the main roads go in the 20-50th to a strip along the Mediterranean Sea (fig. 8). In front of Tunisia one of roads departs from the coast on the South ≈200km [24]. The fires trace road infrastructure, including the southeast site.

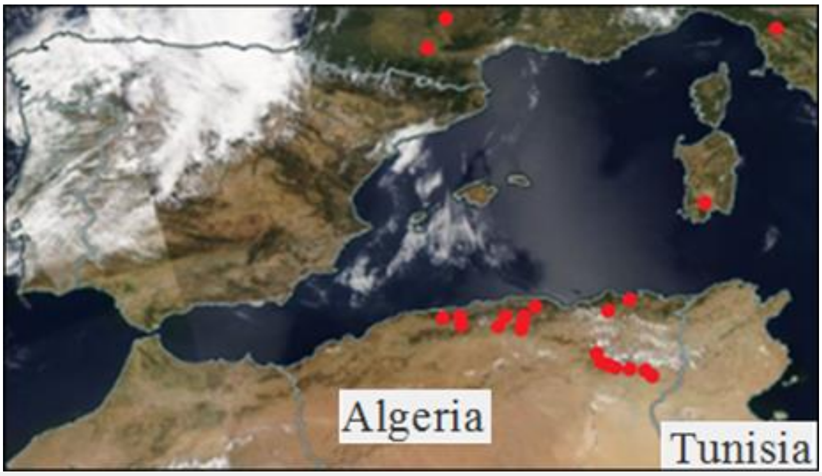

Fig. 8. The fires in the northeast of Africa 01/08/2009.

4. Natural ignitions from an anthropogenic component

Spring fell a dry grass.

Mass pala connected, as with fertilizer of fields ashes of the burned-down rice straw, and with various cults, including fight against snakes practice in China, Indochina and India. In the N-W and Central Europe pala not so frequent (the whole areas, for example, at the end of March, 2019 at the German-Polish border sometimes burn), as in Eastern Europe (fig. 9,a). Reasons, especially spring fires, a little:

1. when thawing the soil and swamps there is a mass decontamination, promoting ignitions of CH_4 preserved by permafrost;
2. in abundance of the Atlantic moisture on N-W Europe in comparison with the center and especially with the East and S-E - Century of the continent;
3. excess of concentration of biogas in the ground atmosphere in the East of the continent over the West (fig. 10) it is connected with fragmentary marshiness, the woods, the chernozem, permafrost in the east and underground congestions of hydrocarbons (for example, Donbass, the second Baku);
4. the undersized lawn and meadow grass with autumn-spring bevelling of a high dead wood in the West and not slanted, sometimes high raznotravy and weeds in the east, including rags (dried up, not lost touch with a plant, standing on a root, escapes), besides for spring dated local deficiencies by O_3 and high transparency of the atmosphere – the conditions favoring to spontaneous ignition [7].

Especially on roadsides of roads it is possible to try to explain with difference in a grass cover lack of mass spring ignitions in the Polish and Lithuanian districts of East Prussia, neighboring to the Kaliningrad region (fig. 9,b,c).

Let's note that the majority of the fires happens on Earth not in the *CIS*, and in Latin America, the Equatorial Africa and Indochina. In Europe – the Balkans, Don reservoir (plavn, chernozem, fossil hydrocarbons) and Northern Portugal [14.15].

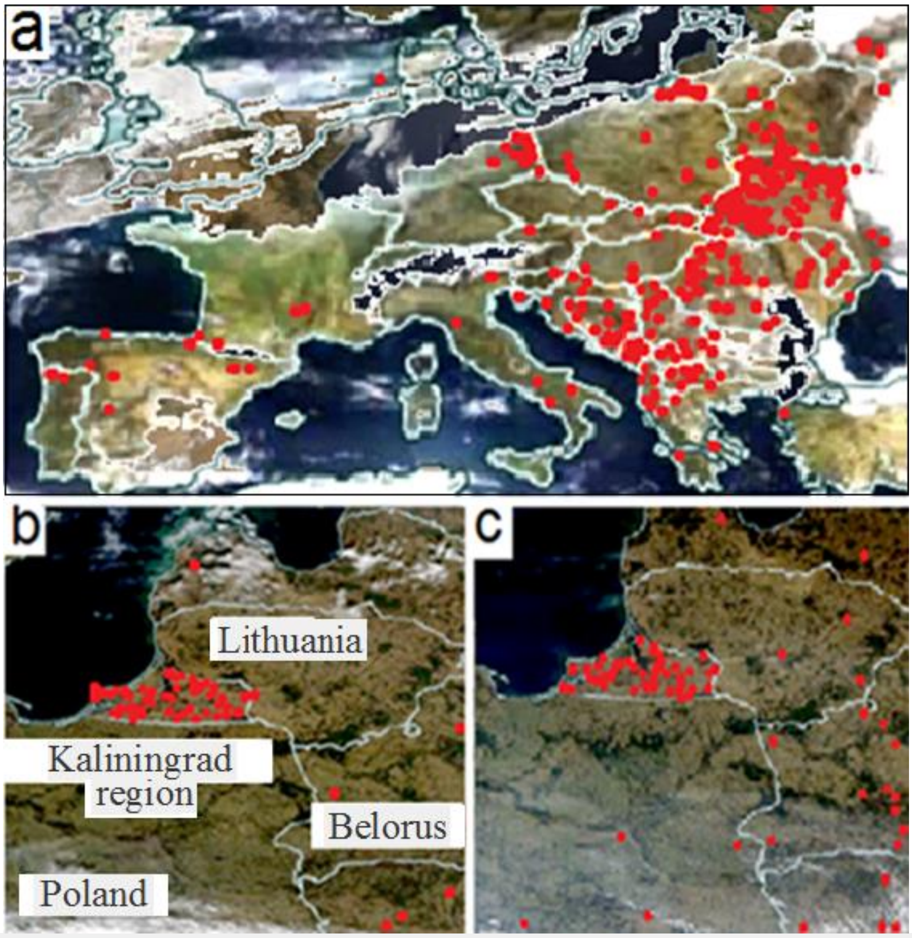

Fig. 9. The fires in Europe 23/03/2019 (a). the fires in the Kaliningrad region and vicinities 24/03/2007 (b) and 28/03/2007 (c).

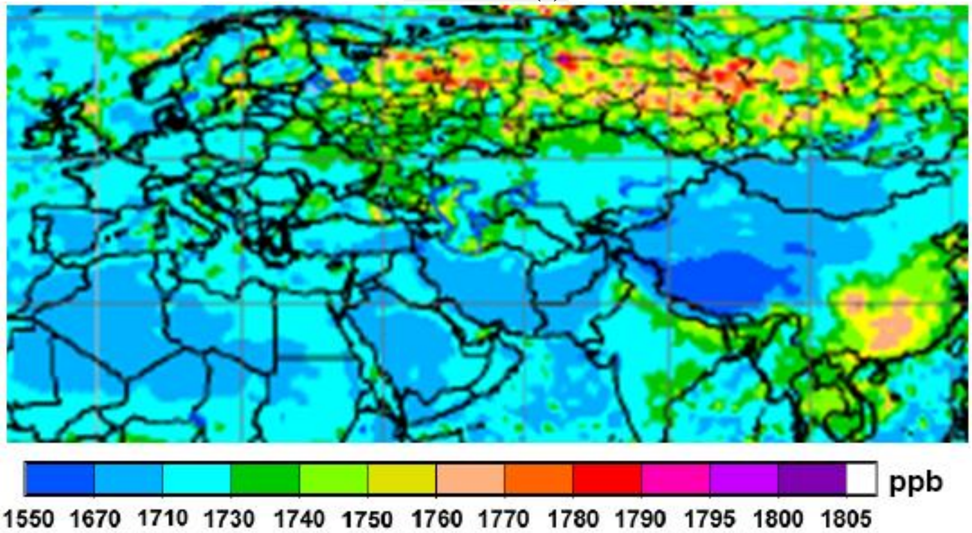

Fig. 10. The average content of CH_4 in the atmosphere of 2003-2005 [25]

In Russia - Belarus - Ukraine on roadsides of roads among native-grasses also the high rags the escapes which - dried up, standing on a root are characteristic that light up from a spark (fig. 11).

Fig. 11. A grass photo (feather grass, rags) and the fires on roadsides it is expensive [26].

For N-W and the center of Europe meadows and artificial lawns from undersized herbs (fig. 12) are characteristic. They are cheaper in operation and are more unpretentious than purely cereal lawns needing a regular cutting for maintenance of height in 5-6 cm.

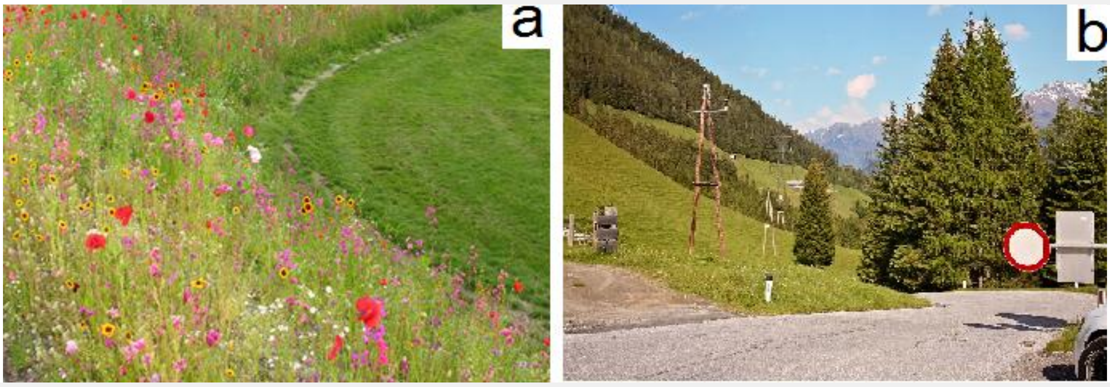

Fig. 12. Meadow(*a*) and lawns (*b*) [27,28].

5. Natural ignitions.
Methane, earthquakes.
With the termination of spring floors from Great Britain and Scandinavia to Spain, North Africa and Turkey the fires become single. Ignitions significantly expand at surges in ground concentration *of* CH_4> 2-5%.
Ignitions in damp spring Britain, as a rule, are single, but in dry days they appear nearly in all counties, including Scotland (fig. 13). For example, 26-28/03/2007 fires coincided with the area of the increased concentration moving over England CH_4 and an earthquake in the center of the island 27/03/2007 measuring (M)=1.3 at a depth (H) of 1.9km, 53.48°N, 1.21°W.

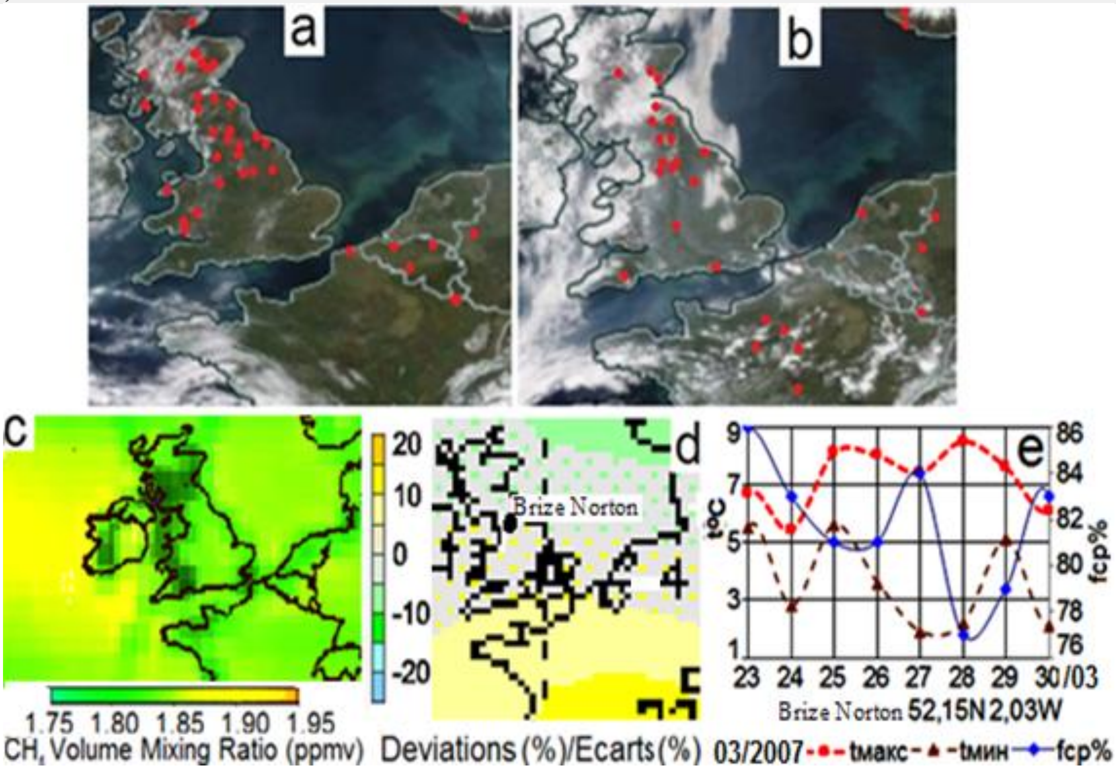

Fig. 13. The fires 26/03 and 28/03/2007 (a,b), concentration of CH_4 on 26-27/03/2007 (c), anomaly of O_3 27/03/2007 (d), meteo data at the English air base Brize Norton (51.75°N, 1.58°W), air temperature max. and min. per day (*tmax℃, tmin℃*), average per day relative humidity (*f%*) (e).

Even in the wet winter in the east of Asia in seismoquiet days sometimes there are dozens of ignitions. For example, 06/02/2009 in the absence of anomalies in CH_4 and O_3 fields in the slightly overcast atmosphere in the Korean region the ignitions were not, in Japan – two fires (fig. 14). To 08/02/2009 against the background of the invariable maintenance of O_3, but with a growth of concentration of CH_4 in North Korea there were about ten ignitions. In the same day against the background of movement through islands of surge in concentration of CH_4 (methane cloud) in Japan - dozens of the fires.

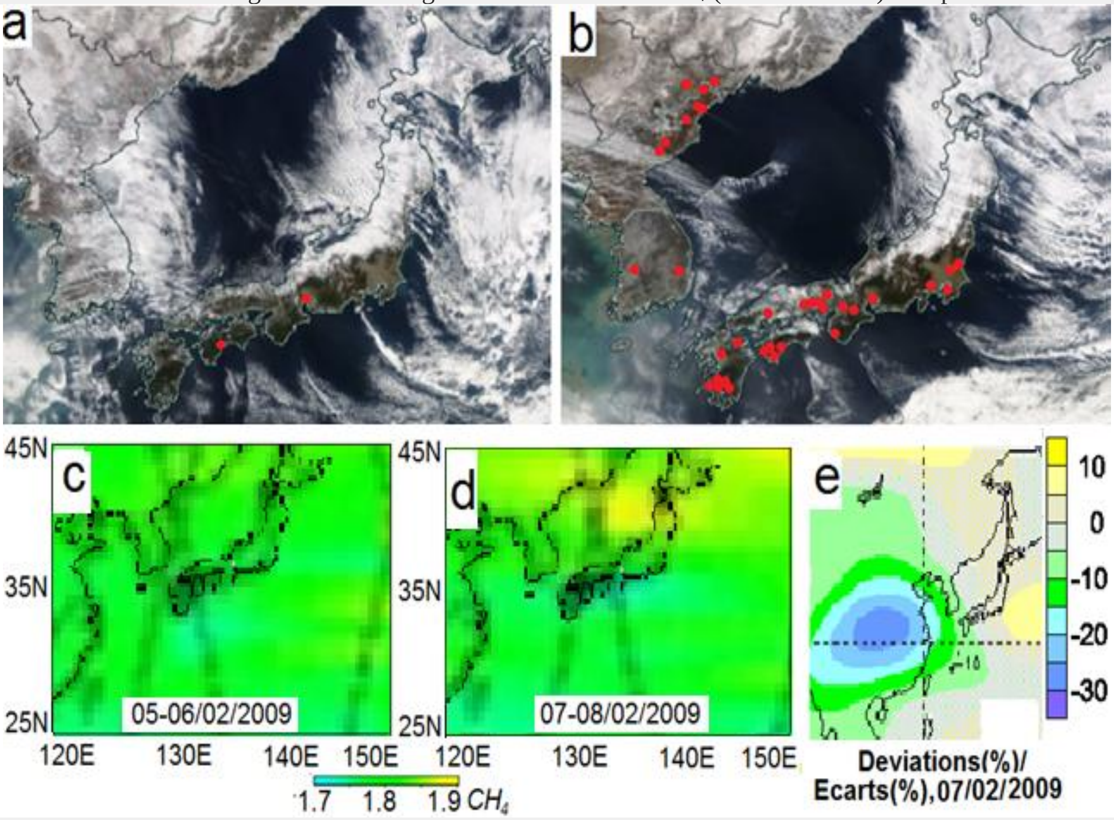

Fig. 14. a,b - the fires 06/02, 08/02/2009, c,d - concentration of CH_4, e - the maintenance of O_3.

Summer ignitions in the mountains of the Caucasus are connected with the gain of power-intensive *UF* of the making solar radiation corresponding to mountainousness for ≈5-15%. The fires also traditionally trace roads from Novorossiysk to Makhachkala (fig. 15,a). 25-26/07/2010 ignitions are not numerous and generally only west of Grozny. 27/07 all foothills of the North Caucasus massively burned, up to suburbs Sumgayit (Azerbaijan) (fig. 15,b). This growth of fire hazard and its realization though was against the background of increase in *tmax℃* on ≈3÷4°C and decrease in *f%* of ≈10% (fig. 16,a), but the main thing, it coincided with movement from Iraq into the North Caucasus of a methane cloud (fig. 15,d-f). Significant reduction of number of the fires in the North Caucasus by 30.07, up to their termination in Dagestan (fig. 15,c), is connected not with weather (dry and a heat remained), and with decrease in the large-scale increased concentration of CH_4 in the region (fig. 15,f). The seismic situation in the region 25/07÷01/08/2010 was quiet [29.30]. During the analyzed period of anomalies of the general maintenance of O_3 in the region was not (fig. 16,b).

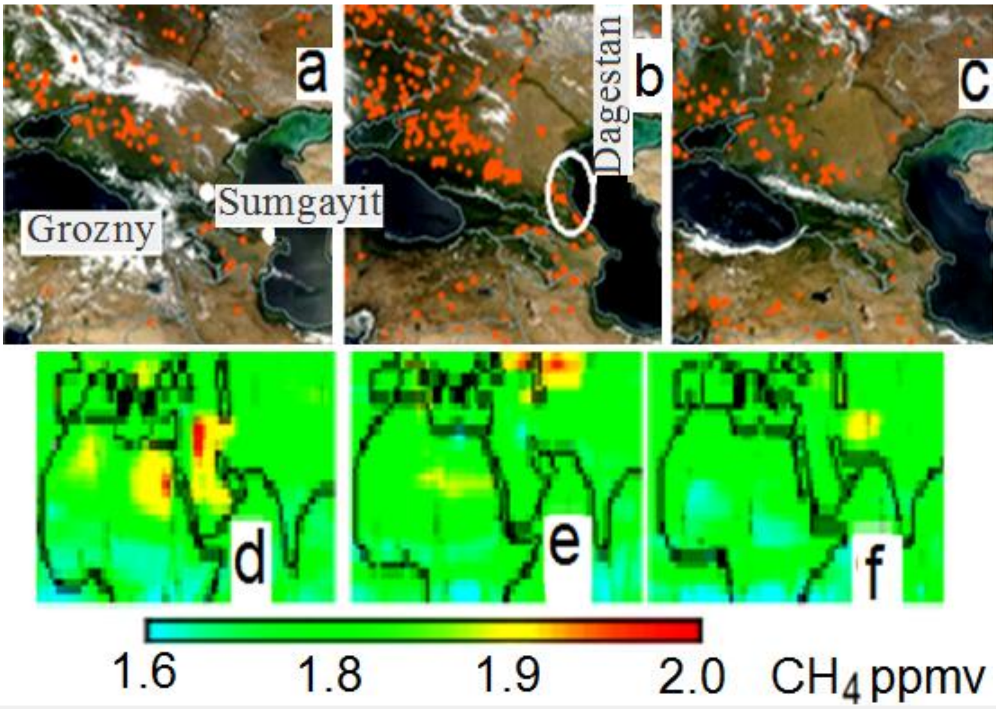

Fig. 15. a-c - seats of fire 26-27. 30/07/2010, d-f - concentration of CH_4 24-25/07, 28-31/07/2010.

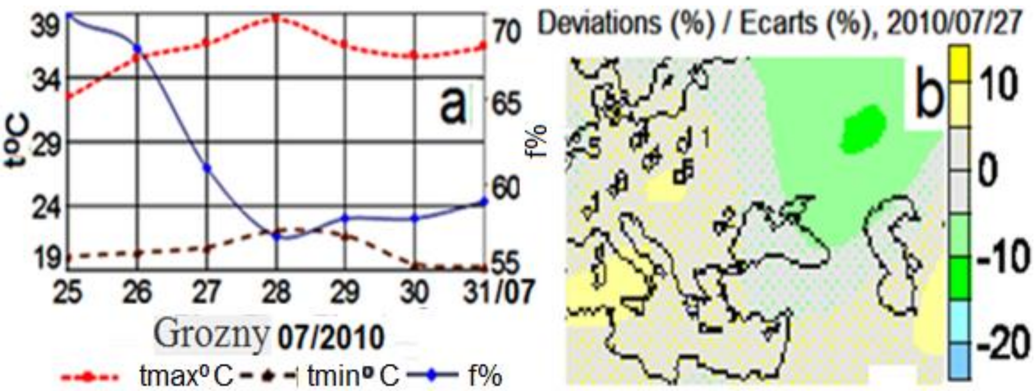

Fig. 16. a - meteo data Grozny; b - relative maintenance of O_3.

In the third decade of February 2019 the fires were in the Pyrenean mountains and in the south of France, including the southern section of the automobile route from the Mediterranean Sea to Paris and at French riviera, and splashes in number of ignitions fell on days of local minima *f%* of – 23/02 and 27/02 (fig. 17). The maximum of number of the fires fell on 27/02, especially to the north of Marseille, in day of earthquakes in Switzerland, the French Pyrenees and, the main thing, on Marseille beach from M=3.5. In the same day against the background of an earthquake in English Channel the number of ignitions twice increased in Belgium. Negative anomaly of the general maintenance of O_3 over N-W Europe 27/02 did not lead to mass ignitions in the cloudless North and the center of France!

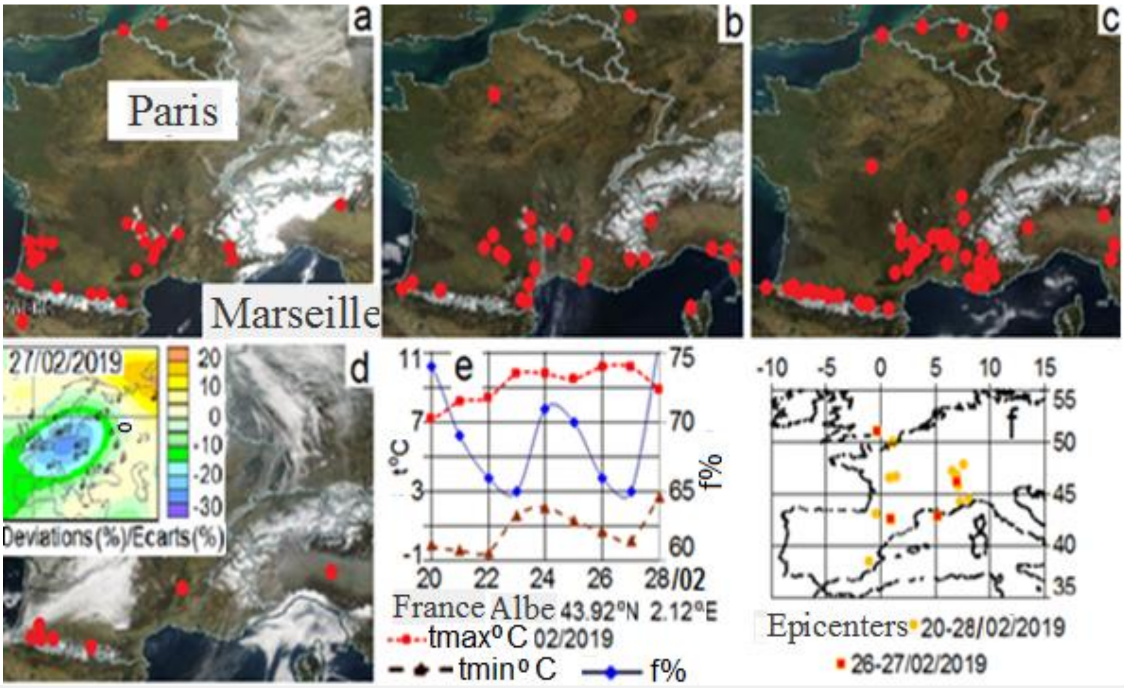

Fig. 17. a-d - 23/02/2019, 25/02/2019, 27-28/02/2019 fires, on insert the abnormal maintenance of O_3, e – meteo data of Mr. Albe, France (43.92°N, 2.12°E), f - epicenters of earthquakes.

In Algeria 08/07/2006 there was only one ignition (fig. 18). But 10/07/2006 with increase in *tmax°C* on 3-6°C to 35°C and decrease in *f%* of 10-13% the number of the fires increased up to 60% many times. Further, to 12-13/07/2006 against the background of recession of *t°C* and growth of *f%* ignition didn't stop. Slow stagnation of number of ignitions was caused by regional earthquakes and surge in concentration of CH_4. The fires abated only to 14/07 not because of significant changes of weather conditions, and as a result of the termination of earthquakes and decrease in concentration of *CH4* [29]. Such combination of regional surges in concentration of CH_4 and earthquakes is caused by cellular and linear structure of a sedimentary cover on which hydrocarbons (fig. 19) migrate.

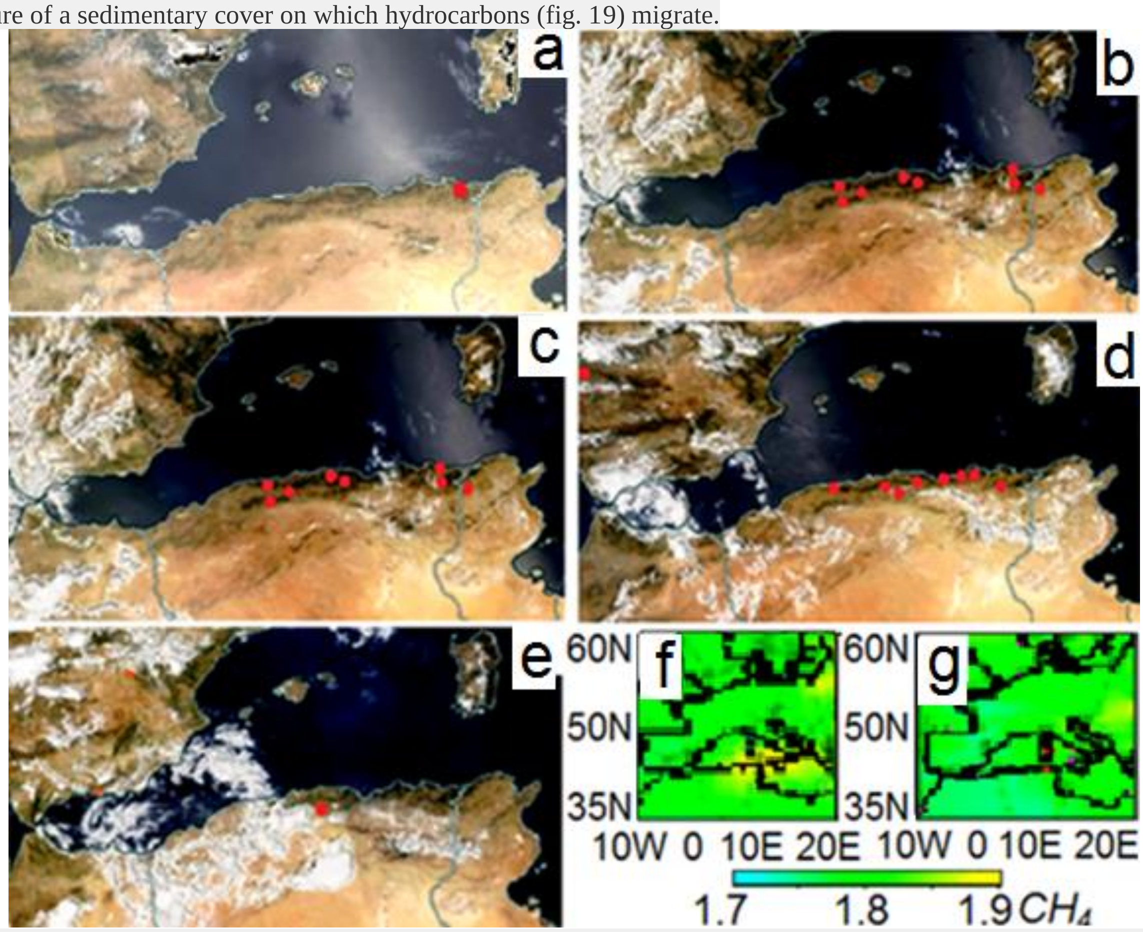

Fig. 18. a-e - the fires 08, 10, 12, 13, 14/07/2006 respectively, f,g - concentration of CH_4 11÷12. 13÷14/07/2006.

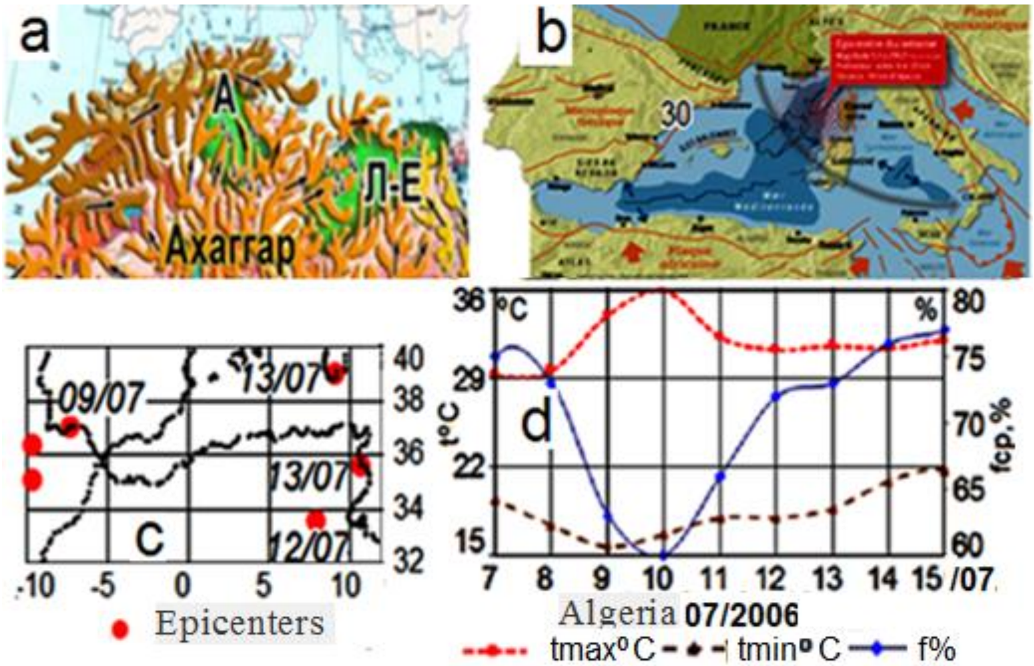

Fig. 19. a - the card of litas of a dynamic situation to North Africa; hollows: A – Algerian, L-E – Libyan-Egyptian, [31]; b - Tectonic scheme of the Mediterranean [32]. c - epicenters of earthquakes in the region 06-14/07/2006 [29]; d – meteo data Algeria.

In the seismoquiet delta of Nile in October, 2006 at the maintenance of O_3 was higher than norm on 5÷15% the situation with the fires is not stable (fig. 20). Against the background of fluctuations of concentration of CH_4 and *f%* from time to time almost all delta burned from time to time. The fires (09/10, 12/10, 17/10) at recession of *f%* and growth of *t℃* began, abated (11/10, 13/10 and after 18/10) – with increase in *f%* and reduction of *t℃*. Amplitude of fluctuations of *f%* was ≈30%; *t℃*≈5℃. Because of several various periods of data smoothing, there is no unambiguous sinkhnoization in changes of concentration of CH_4 and number of ignitions. For example, 8-11/10 they sinfazna, 12/10 growth of number of the fires advanced splash in CH_4 (13-14/10) for day two, passing of a methane cloud 15-16/10 for day two outstripped increase in number of ignitions (17/10). In general the trend of the course of number of the fires was more synchronized with *f%*.

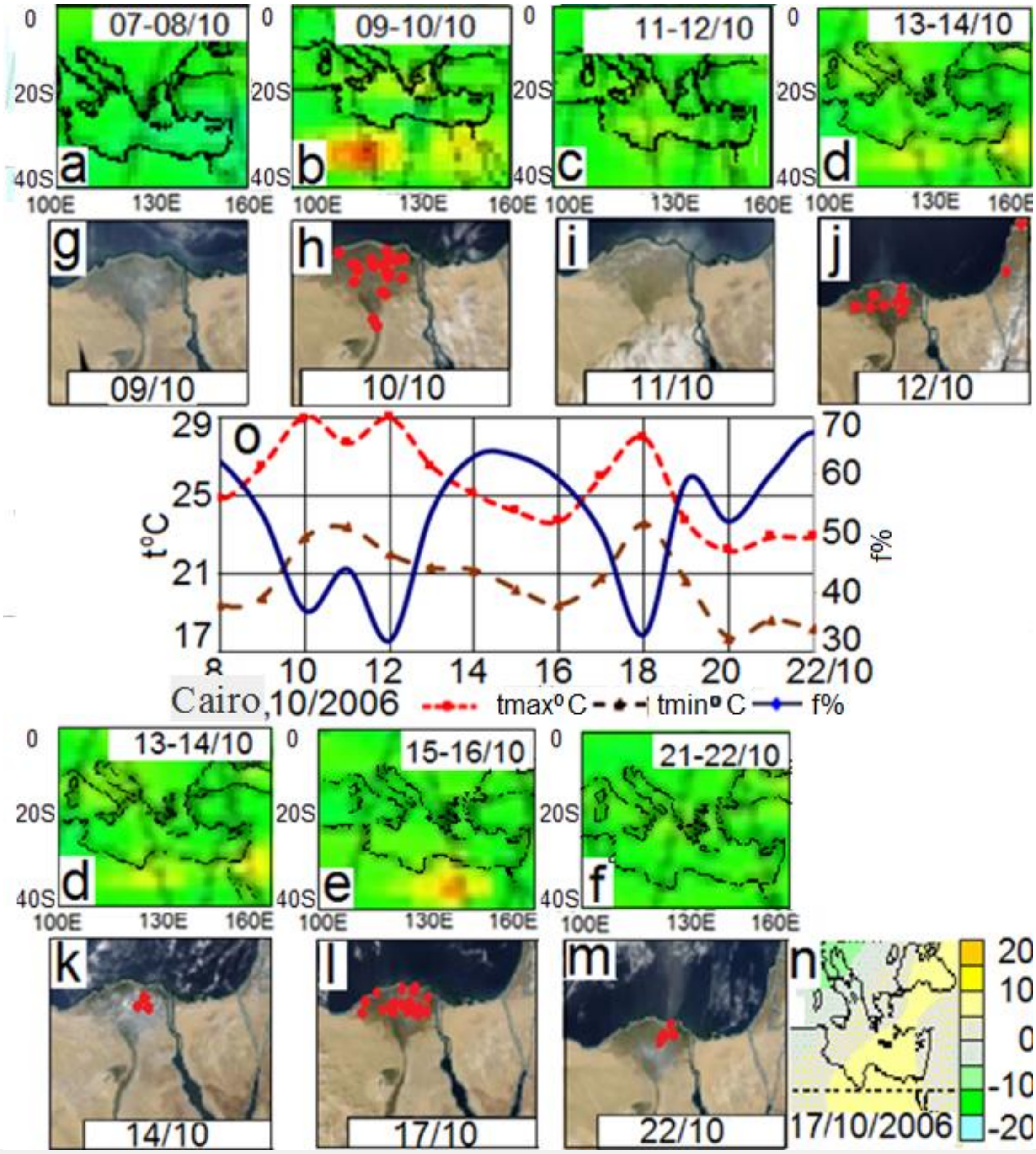

Fig. 20. a-c, d-f - concentration *of CH4 07-22/10.2006*; g-j, k-m - the fires on S-E of the Mediterranean 09-22/10/2006; o – meteo data Cairo 08-22/10/2006.

The increased concentration of CH_4 14-15/03/2008 over seismically quiet N-W India at the normal maintenance of O_3 were followed by weather conditions, comfortable for ignitions*: tmax℃>35℃, f%*<35% and, as a result, mass fires (fig. 21). Despite dry, even more suitable for the fires (growth of *t℃* on 2-3℃ and recession of *f%* for 5%) the number of the fires 16-17/03 was cut by half. It is all about CH_4! The discussed cloud of CH_4 16-17/03/2008 was displaced in the center of India "having taken away" the fires. There was it against the background of two earthquakes in the center of India (33.8°N, 74.8°E, M=3.5, N=10km and 29.8°N, 81.5°E, M=4.7, H=10km [29]). To 19/03 and this methane cloud thawed, under it the fires against the background of a cold snap on 3÷5℃ and growth of *f%* for 10% abated. In the northeast of India the mass fires began 20/03 in day of 2 earthquakes (34.6°N, 82.9°E, M=3.8, H=64km, 35°N, 81.1°E, M=5, H=38km).

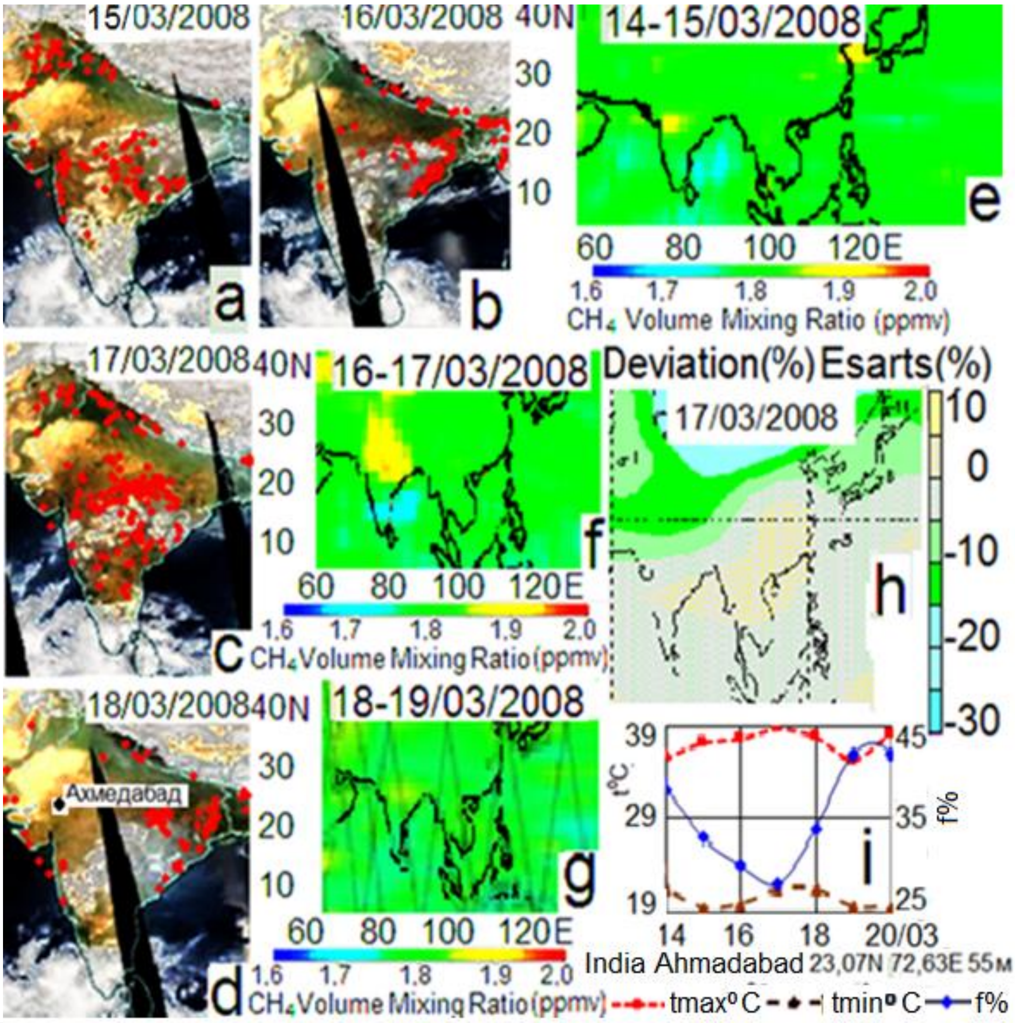

Fig. 21. a-d - seats of fire 15-18/03/2008 in India; e-g - concentration of CH_4; h - maintenance of O_3; *i* – meteo data Ahmedabad.

By the end of March, 2009 in the west of India against the background of lack of anomalies in CH_4 and O_3 fields and also earthquakes (till 08/04/2009) ignitions were single (fig. 22). To 01/04 over the Bombay region there was a splash in CH_4 and there were mass ignitions. To 06/04 despite the "best" weather conditions for burning (growth of *t°C* and recession of *f%*) the fires stopped. It is all about leaving the region of a methane cloud!

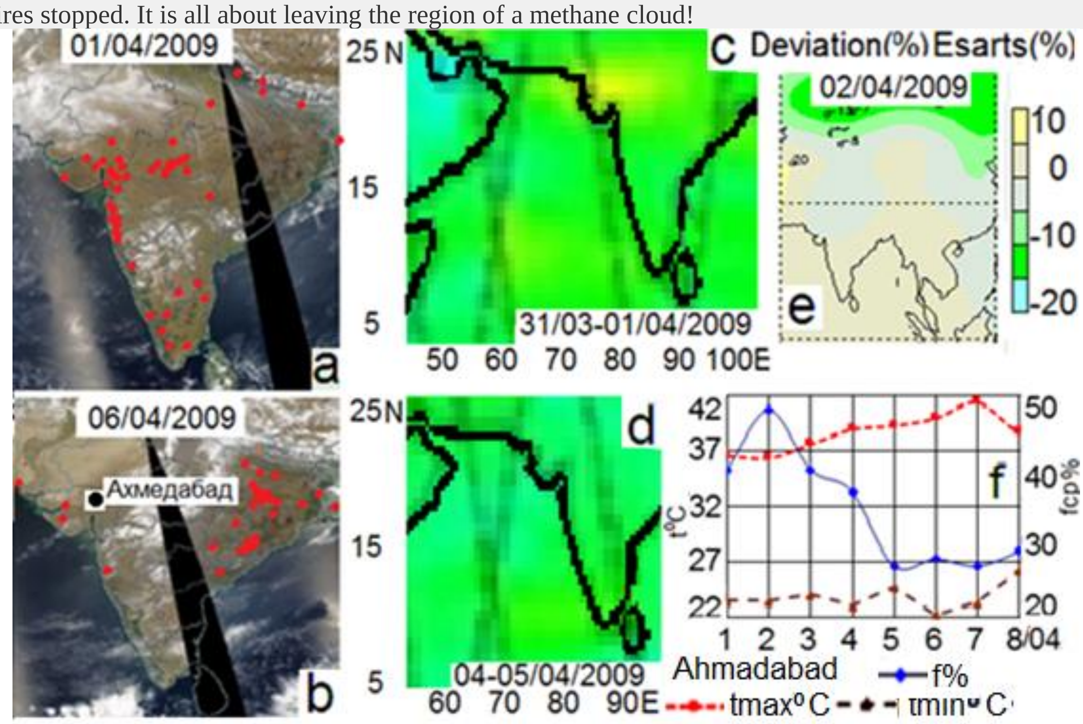

Fig. 22. a,b - the fires in India; *c*,*d* - concentration of CH_4; e – relative maintenance of O_3; f – meteo data of Akhmedas.

6. Ozone, mountains

One of genesis of natural ignitions – reduction of absorption of solar radiation the atmosphere. It is characteristic first of all of the mountain area. For example, 09÷14/02/2004 the fires were consolidated in the hilly terrain in the north of the Iberian Peninsula and especially at heights ≈3km where the intensity of power-intensive *UF* of radiation is twice higher, than at the surface of the sea (fig. 23). However, the fires were not daily, and in days of local minima *f%* of – 10, 12 and 14/02 (11/02 clouds) (fig. 24). Was not succeeded to connect interdaily changes of number of the fires with the course of anomalies in O_3 field (Fig. 25). Separate ignitions were these days along the Mediterranean coast of France at *f%* <60% (fig. 23,b). The fires 14/02 were perhaps promoted 10÷15% deficiency of O_3 13/02 (fig. 25,e).

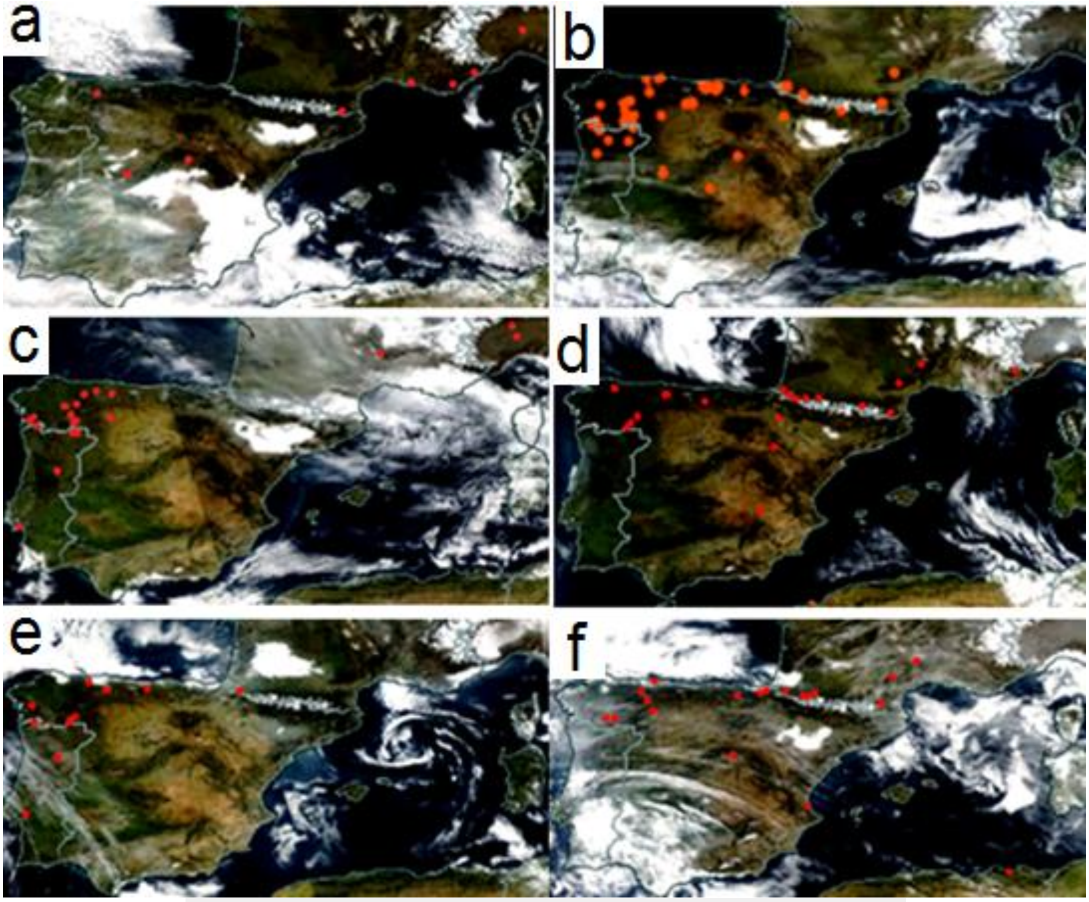

Fig. 23. a-f - the fires 09-14/07/2004 in the Spanish-French region.

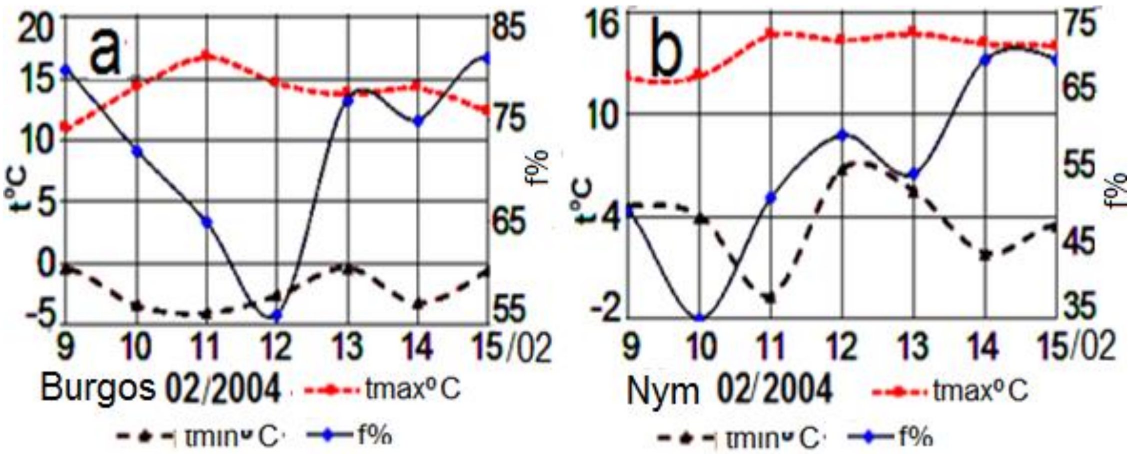

Fig. 24. a - meteo data Burgos, Spain 42.35°N, 3.63°W, 890m; b - to them airport, France 43.87°N, 40°W, 62m.

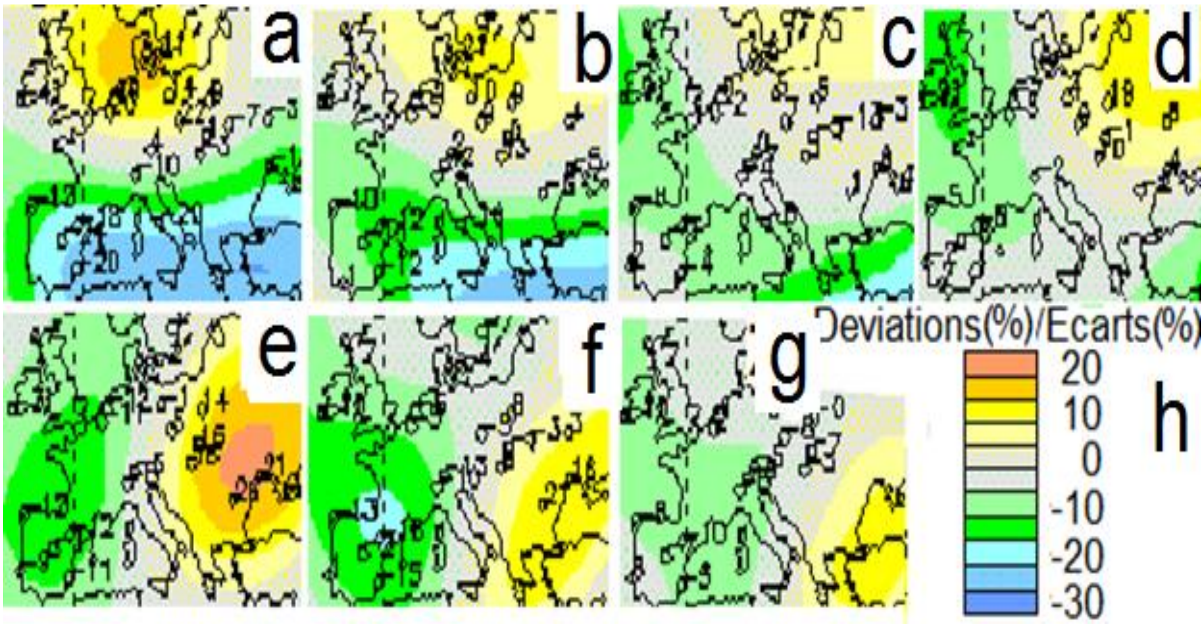

Fig. 25. a-g - the relative general maintenance of O_3 08/02÷14/02/2004; h - O_3 scale.

In the second half of March, 2009 the strip of the fires was stretched from the North of Portugal along the Biskaysky coast of Spain and further on the Pyrenean mountains (fig. 26). In CH_4 field of significant anomalies was not (fig. 27). In a strip of the fires 15/03-16/03 and was 21/03/2009 the 150-200th a gap before the Pyrenean mountains. At increase in *t℃*, reduction of *f%* 17/03-20/03, emergence over the North of Spain 19/03 ozone holes and earthquakes M=2.7 discussed gap lit up. To 21/03 with a growth of O_3, of *f%* and seismic tranquility the fires stopped.

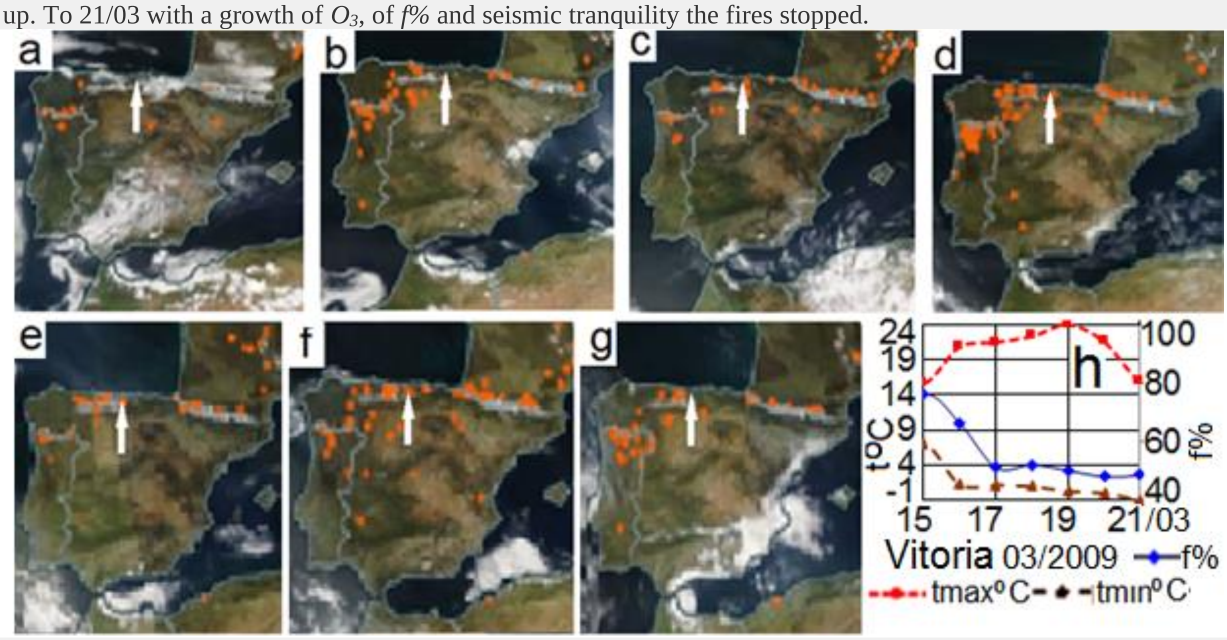

Fig. 26. a-g - 15-21/03/2009 fires, over a white arrow earthquake epicenter 19/03/2009 (42.8N 2.6W); h – meteo data Vitória (42.88°N, 2.72°W).

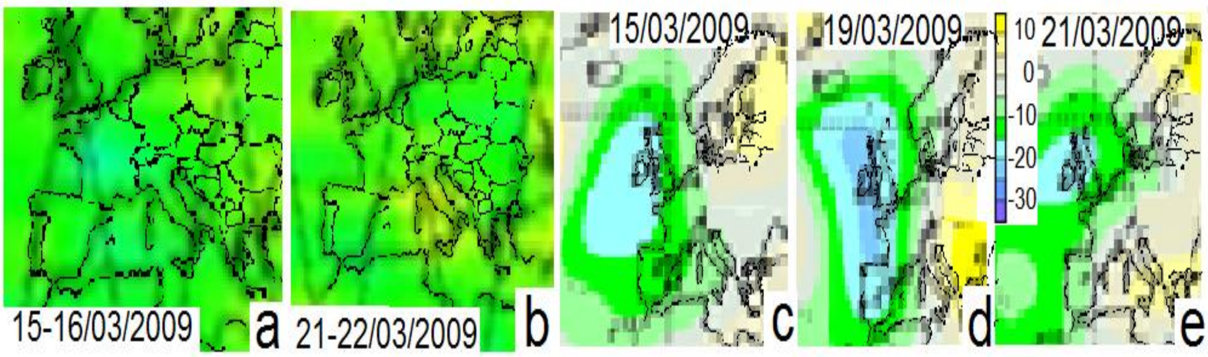

Fig. 27. a, b - concentration of CH_4; c-e - anomalies of maintenance of O_3.

In the N-W of the Iberian Peninsula (North of Portugal) 01-02/08/2010 fires are single, and in the N-W of Africa, on the contrary, are frequent (fig. 28). All specularly changed 03-04/08. A lot of ignitions in the north of Portugal and recession many times numbers of the fires in Algeria. Why? In the north of Portugal 01-02/08 was damp weather, and in Algeria – dry, besides on the Tunisian part of a break of earth crust (fig. 28,d, fig.29) the earthquake occurred. To 03-04/08 situation in the north of Portugal became more fire-dangerous: *tmax℃* increased on 5℃, and of *f%* decreased by 20-25%. A response - 8-15 ignitions. The confinedness of ignitions to the North of Portugal is connected with its mountainousness (higher than the South on ≈0.5-1.5km) that corresponds to gain of power-intensive *UF* of the making solar radiation for ≈5-10%. In Algeria 03/08 in lack of earthquakes after increase in *f%* for 10% the number of the fires was reduced many times. 04/08 humidity in Algeria returned to level 02/08, but the number of the fires occupied intermediate value between 02/08 and 03/08. The reason of "shortage of ignitions" in lack of seismodecontamination of CH_4.

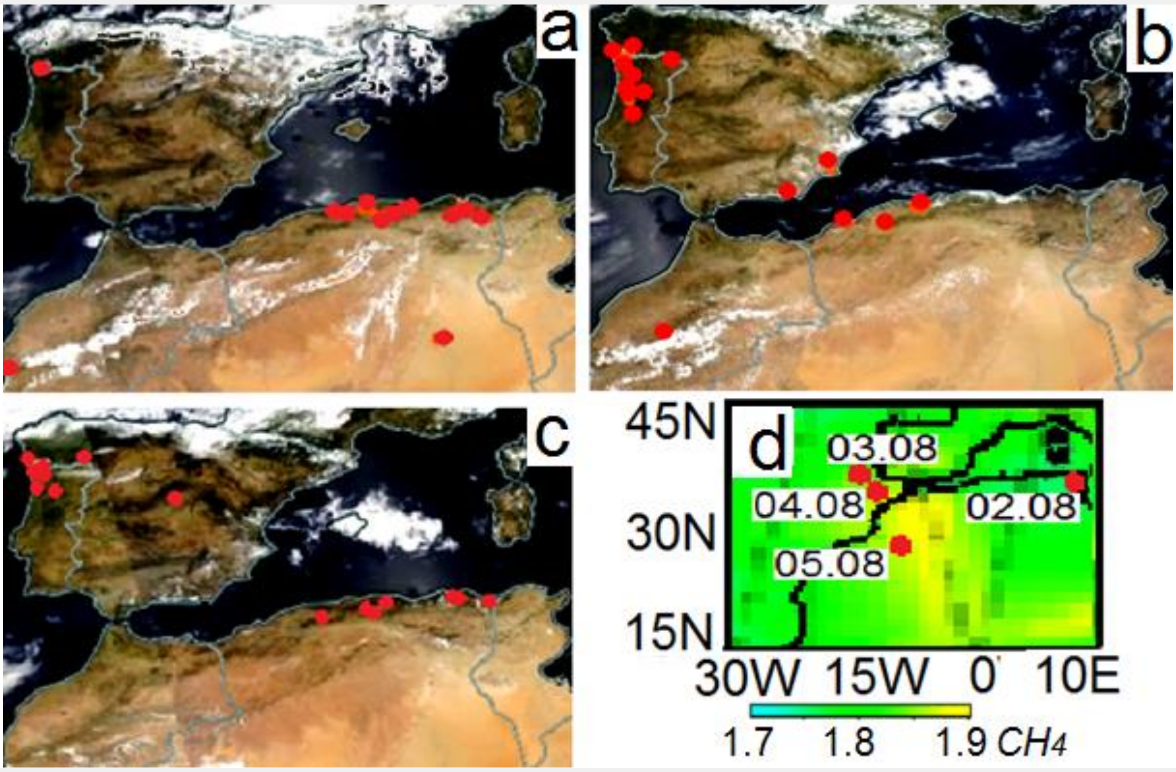

Fig. 28. *a-c* – the fires on Iberian Peninsula and N-W Africa 02-04/08/2010 respectively; d – concentration of CH_4 03-04/08/2010, red circles are epicenters of earthquakes.

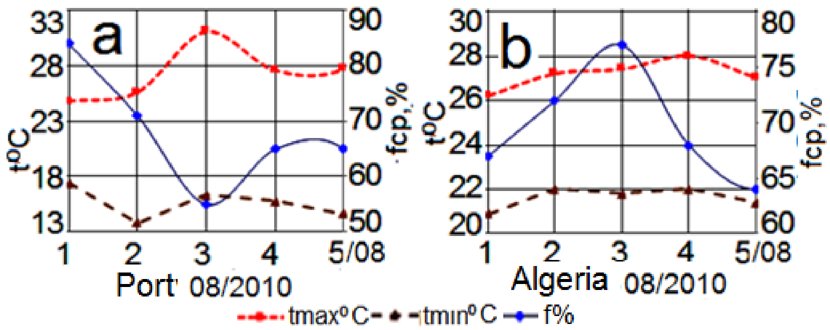

Fig. 29. a – meteo data of Porto (Portugal); b - meteo data Algeria.

On the Iberian Peninsula in seismically quiet days 12-20/02/2021 only 15/02 some increase in number of the fires (fig. 30). It coincided with deficiency O_3 and a local minimum of *f%*.

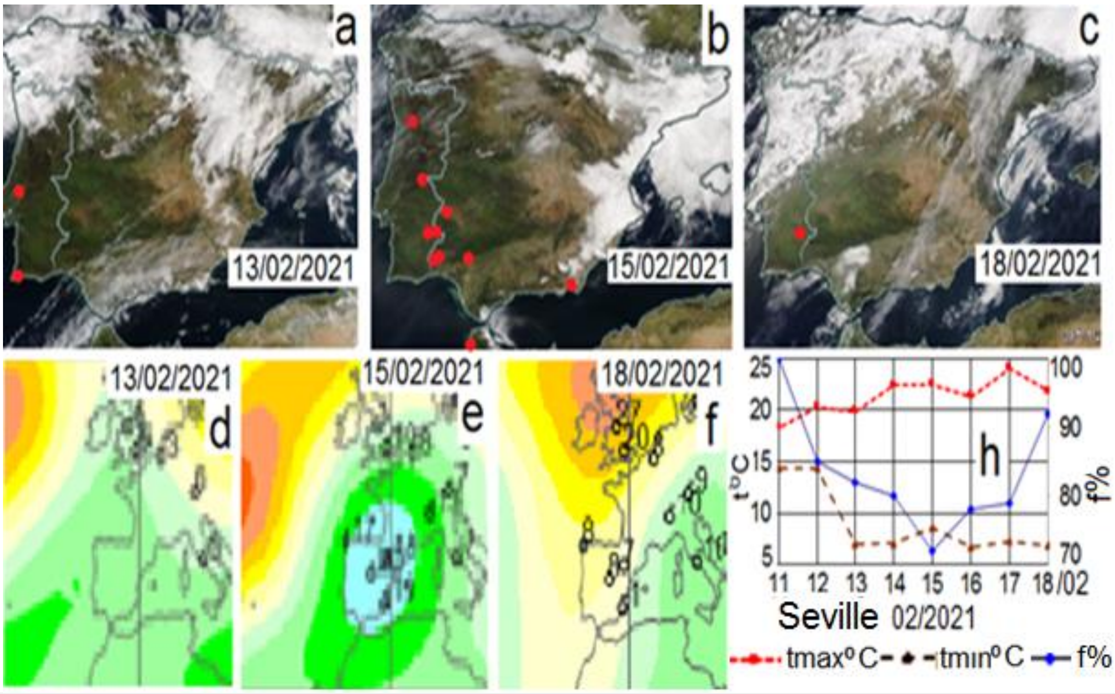

Fig. 30. a-c - the fires in Spain and the Strait of Gibraltar; d-f - anomalies of maintenance of O_3: h - meteo data Seville.

In the southeast of France, at the Alps and in Northern Italy 14/02-17/02/2021 mass fires are not recorded against the background of *tmin℃*≈0°C and the maintenance of O_3 at norm (fig. 31). In the third decade of February over the region there was an ozone hole in - 15÷-29%. 22/02 there was an earthquake (45.66°N, 11.13°W, M=4 [33], *tmin℃* approached 5°C and ignitions began. In France the fires continued up to 25/02 (despite the local growth of *f%* up to 90%), further - clouds. In Northern Italy the mass fires began only 27/02 at decrease in *f%* lower than 75%. To 28/02 despite universal decrease in *f%* in cloudless weather against the background of a day cold snap on ≈5°C the fires in the region stopped (the dry grass burned out?)?

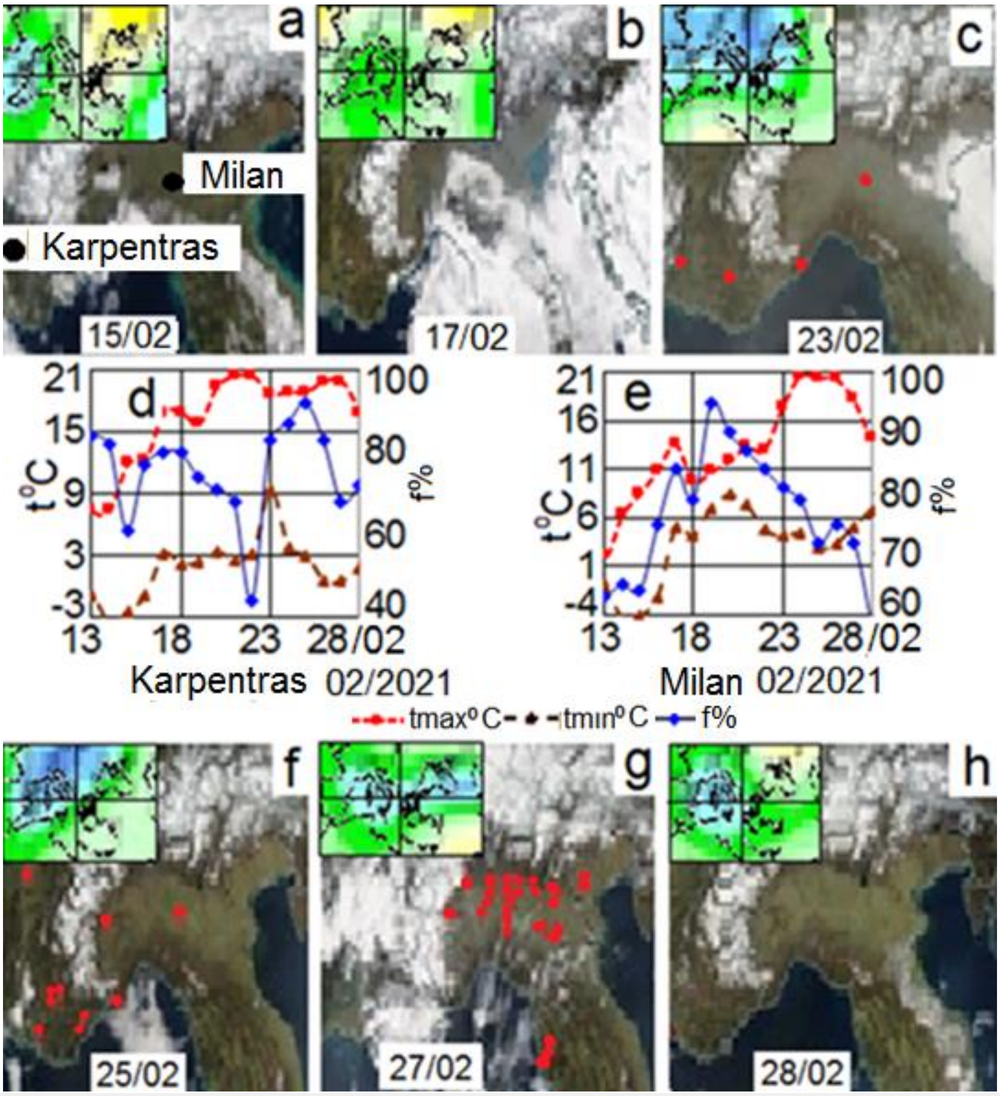

Fig. 31. a-c - the fires 15/03, 17/03, 23/03, f-h - 25/03, 27/03, 28/03/2021 in the S-W of the Alpine region; d-e the French Alps have meteo data in the second half of February 2021 (Mr. Karpentras 44.08°N, 5.05°E. 105m), Milan.

Manifestation of multiple-factor dependence of number of ignitions on weather conditions and the maintenance of O_3 follows from the analysis of materials in South Africa. During the seismoquiet period with 02/05 on 07/05/2015 the mass fires at Cape Town were only 04/05 and 06/05. Ignitions 04/05 were observed at a local maximum of *f%* (85%), but in the conditions of deficiency O_3<-10% (fig. 32). The fires 06/05 were in lack of deficiency of O_3, but at decrease of *f%* for 15%.

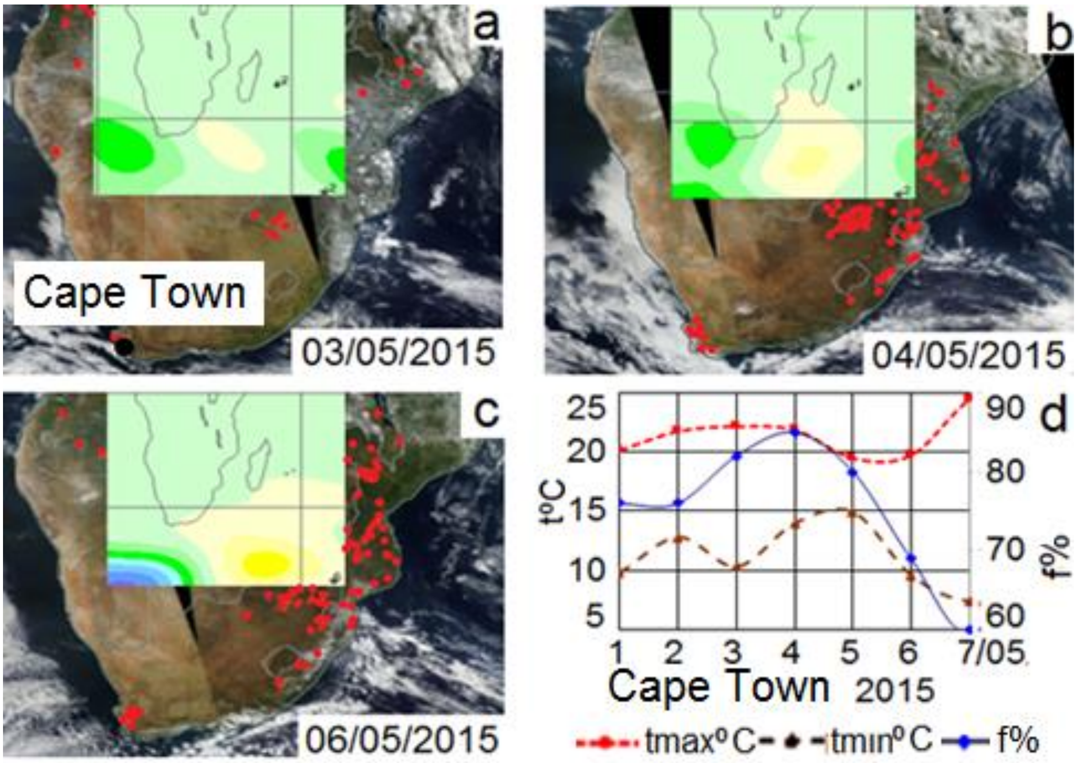

Fig. 32. a-e - the fires in South Africa, on inserts the size of abnormal contents O_3; d - meteo data Cape Town.

During the seismoquiet period with 08/05 on 21/05/2015 the mass fires at Cape Town were only 12 and 19/05 (fig. 33). Transition from 10/05 when the fires were not, to 12/05 was followed not only ≈5℃ by growth of *t℃* and recession of *f%*≈5%, but also emergence of deficiency of O_3<-3. To 16/05 against the background of growth of *f%* for 20% and return of maintenance of O_3 to norm the fires stopped that 19/05 despite high of *f%* (83%), warm night (>11℃) and cool day (≈20℃) to renew thanks to emergence of deficiency of O_3>5%.

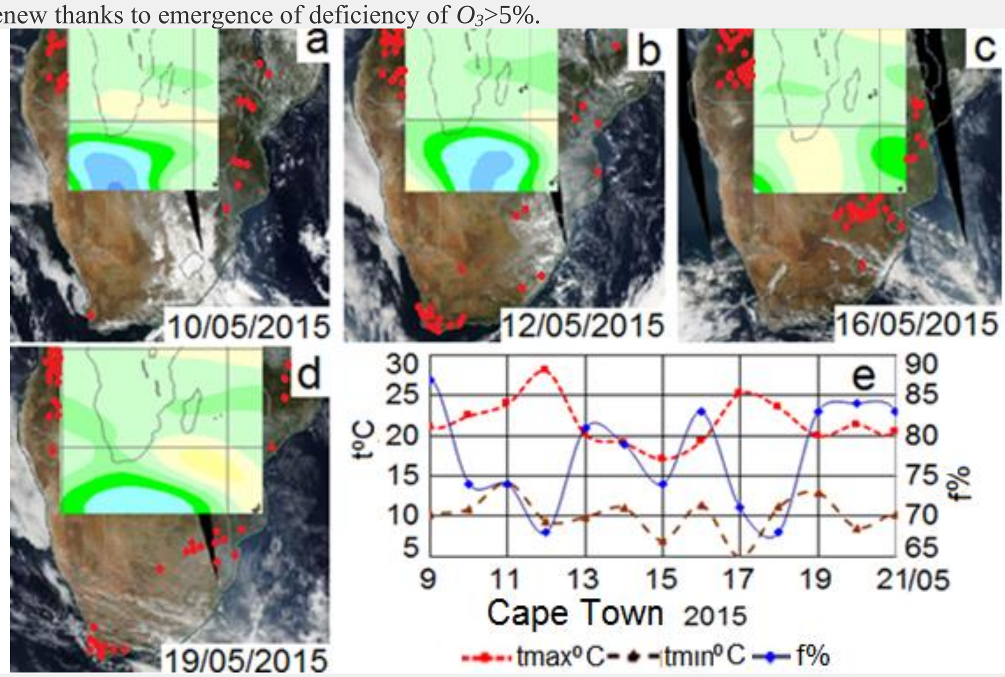

Fig. 33. a-d - the fires in the South of Africa, on inserts the size of abnormal contents O_3; e – meteo data Cape Town.

Growth of the fires not everywhere inphase with a temperature. At the end of December 2019 in the center of Western Australia where temperatures were over 40℃ where a minimum of breaks of earth crust the number of ignitions is minimum (fig. 34). The fires concentrated at fault zones in the center and in the south of the continent where it was 5-10℃ more cool and also in the North and the East with *tmax*<25-32℃!

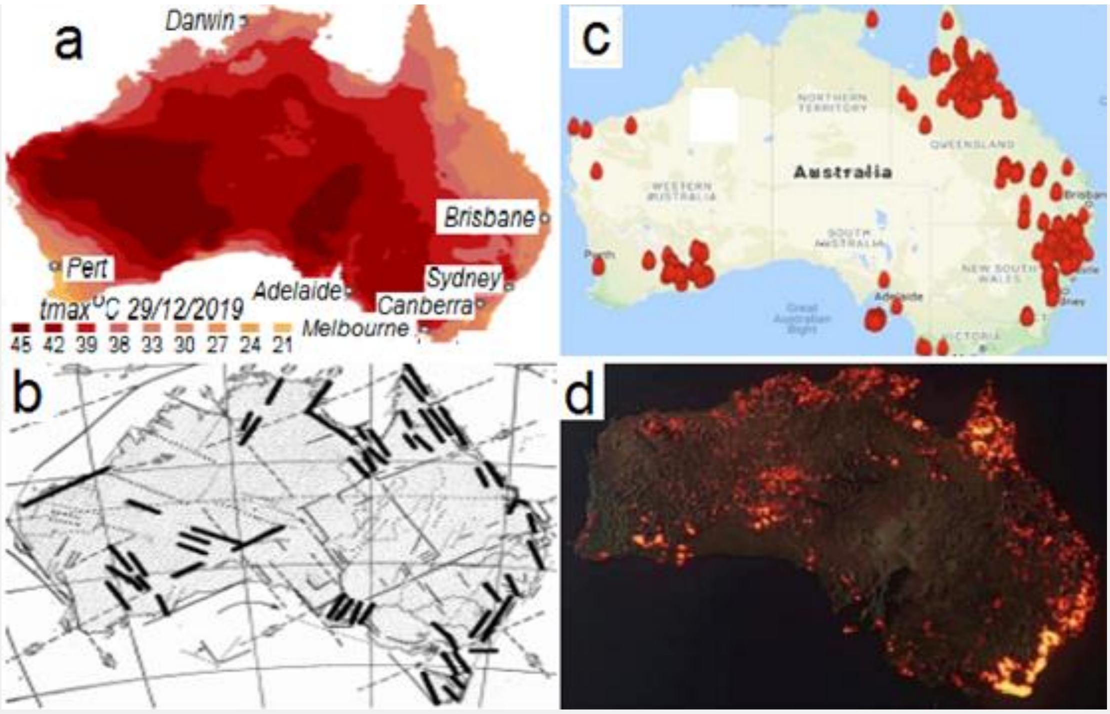

Fig. 34. The maximum air temperature in Australia 29/12/2019 (a), breaks of earth *crust* (b) and the fires in Australia (c, d) [34.35].

Not all quasi-cloudless steppe situations with abnormally high content of CH_4 by all means "burn". For example, over often burning S-W Australia 13/10-14/10/2004 in slightly overcast conditions was the increased concentration of CH_4, however the number of the fires practically did not differ from the next cloudless days without anomalies of CH_4 – 1-3 fires (fig. 35). It is caused by a drizzle that it was fixed 4 times per day (fig. 36).

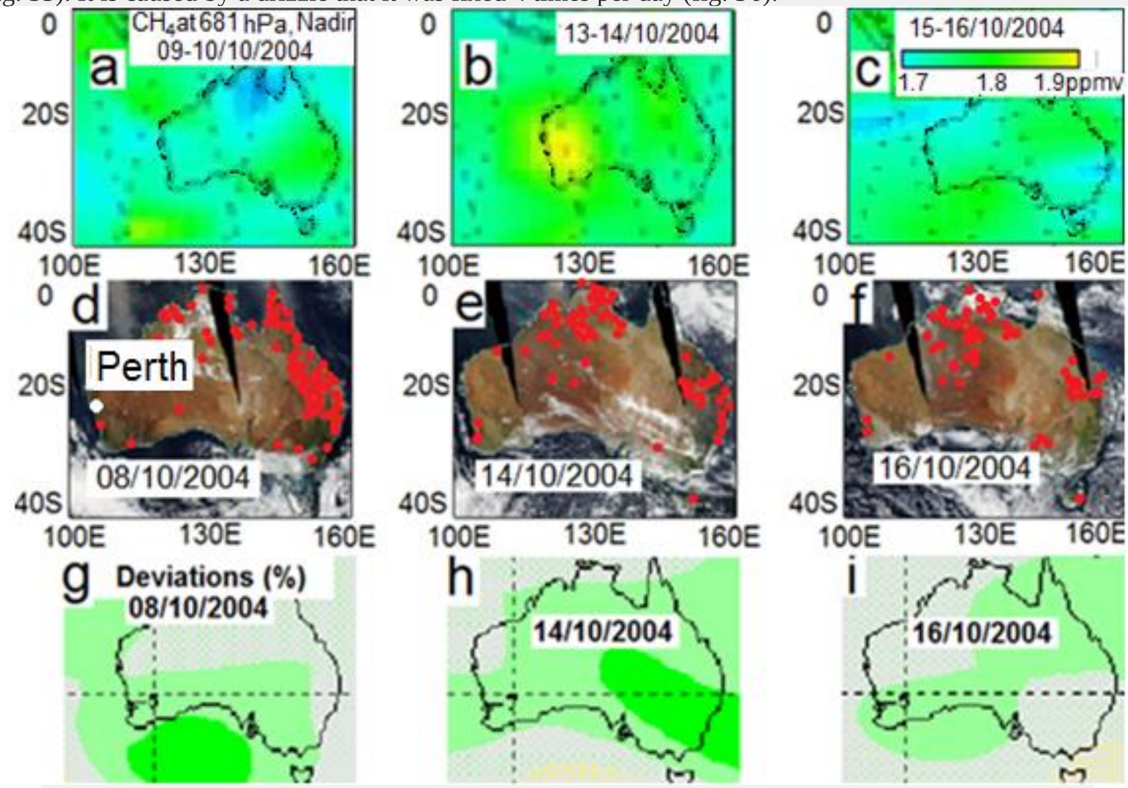

Fig. 35. a-c - concentration of CH_4; d-f - the fires in Australia; g-i - the relative maintenance of O_3.

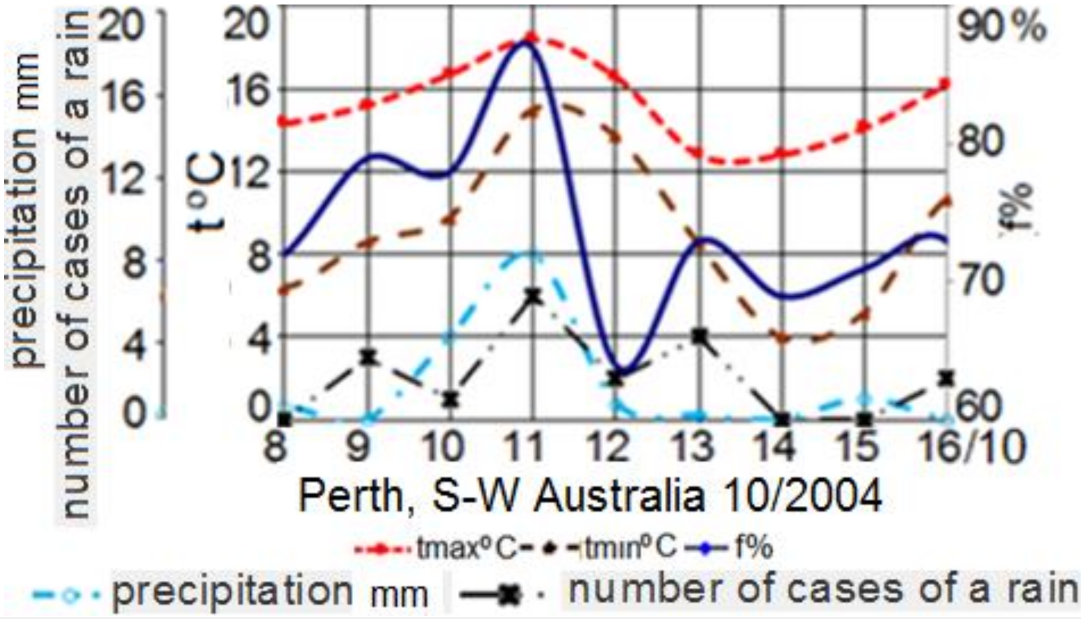

Fig. 36. Meteo data Perth S-W Australia.

7. Conclusions

From the works [14,15] which received confirmation and in the real work:

1 Growth of number of ignitions in days of increase in concentration of methane in the lower troposphere of ≥5% is tended. Deviations from a trend are caused by lack of unambiguous communication between activization of decontamination of methane and dry weather.

2 The natural fires become more active at parts of breaks of earth crust with positive anomalies of magnetic field.

3 For minimization of the natural fires it is not necessary to store hay and straw in fault zones of earth crust. In areas of positive anomalies of magnetic field it is expedient to place lightning rods (interception rods), in peat bogs with isolation on peat depth.

New conclusions from the presented work

The deficiency is dangerous by ozone of the fire in droughty days.

4 For minimization of the fires follows, at least, on roadsides of roads and active faults of earth crust a wild-growing high grass to replace with an undersized lawn or meadow grass with autumn-spring bevelling of a high dead wood

5 On grass roadsides of roads and active faults of earth crust to mount pipes with water sprayers for watering in droughty days.

8. Literature

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