

Influence of fires on steppe vegetation in Dauria

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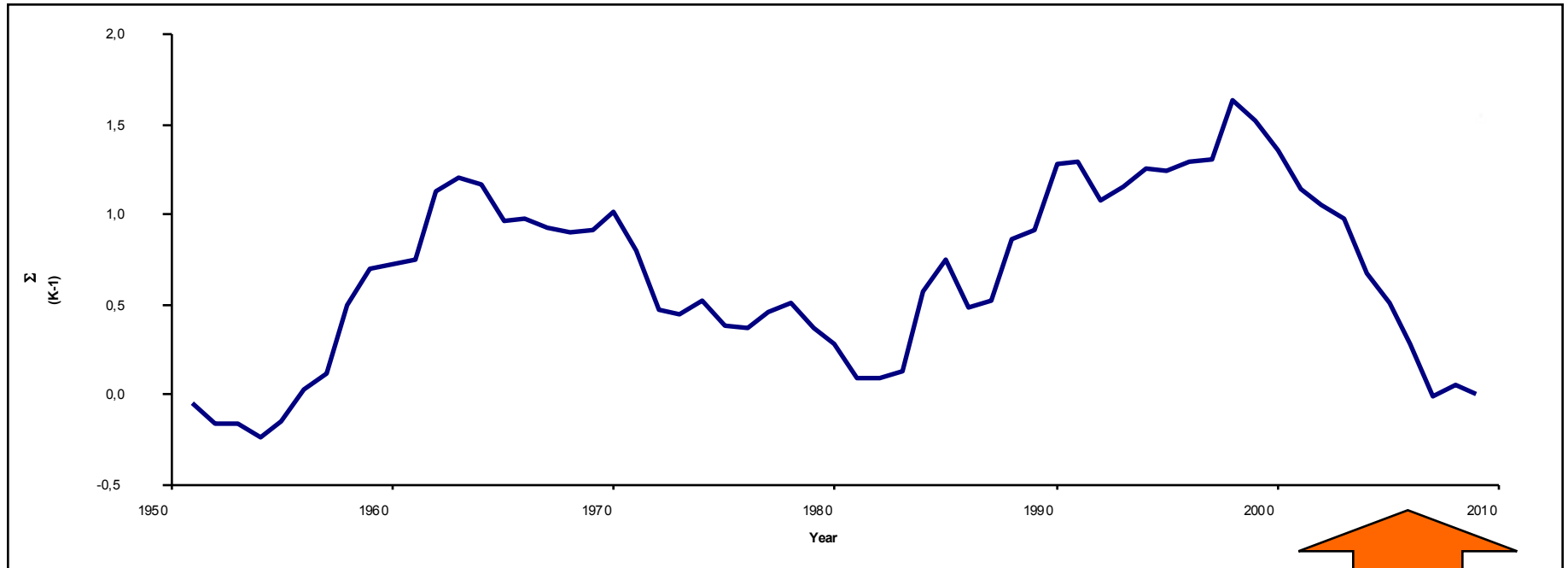


Methods and materials

- Shape-files based on ModisTerra imagery for 2000-2010 (www.gis-lab.info)
- Field route geobotanical sampling (2002-2004; 2008-2013)
- Monitoring of experimental burned plots (2006-2010)



Annual precipitation dynamics in Onon-Argun inter-river area

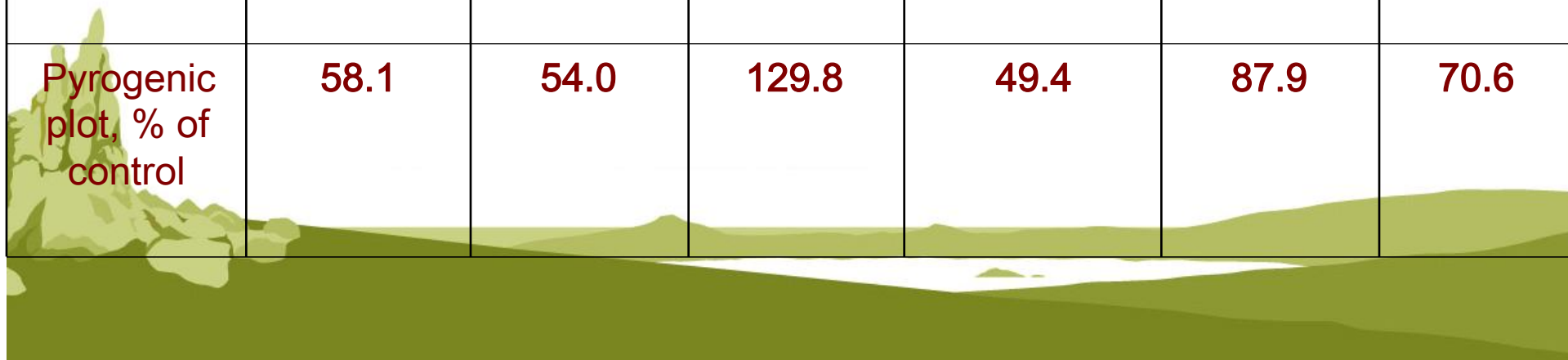


(by V.A.Obyazov, 2011)



Overground green phytomass and mortmass at experimental plots after 3 years after burning

	<i>Puccinellia tenuiflora</i> meadow		<i>Leymus chinensis</i> steppe		<i>Stipa krylovii</i> steppe	
	green phytomass	mortmass	green phytomass	mortmass	green phytomass	mortmass
Control plot, g/m ²	96.6±5.78	60.0±8.5	97.4±12.65	116.21±24.66	90.6±6.77	54.5±4.89
Pyrogenic plot, г/м ²	56.1±7.11	32.4±6.31	126.4±8.71	57.4±14.50	79.6±4.99	38.5±4.35
Pyrogenic plot, % of control	58.1	54.0	129.8	49.4	87.9	70.6



Soil erosion in burned steppes



A. Water erosion on a slope with steppe vegetation.

B. A tuft of *Stipa krylovii* towering above soil level as a result of erosion caused by fires.

Soil temperature regime from 9.00 to 21.00 after 3 years after burning

Phytocoenosis	Plots	Mean for a day				Mean temperature (max – min)			
		5 cm	10 cm	20 cm	Mean for 3 depths	5 cm	10 cm	20 cm	Mean for 3 depths
<i>Puccinellia tenuiflora</i> meadow	pyrogenic	21.4	19.7	17.4	19.73	7.9	5.8	2.8	5.5
	control	20.4	18.8	18.1	18.97	4.6	3.6	2.0	3.4
	<i>difference</i>	<i>1.0</i>	<i>0.9</i>	<i>0.4</i>	<i>0.8</i>	<i>3.3</i>	<i>2.1</i>	<i>0.8</i>	<i>2.1</i>
<i>Leymus chinensis</i> steppe	pyrogenic	22.1	19.3	15.5	18.97	12.0	8.6	3.9	8.2
	control	19.3	16.8	13.6	16.57	7.8	5.3	2.2	5.1
	<i>difference</i>	<i>2.8</i>	<i>2.5</i>	<i>1.9</i>	<i>2.4</i>	<i>4.2</i>	<i>3.33</i>	<i>1.73</i>	<i>3.08</i>
<i>Stipa krylovii</i> steppe	pyrogenic	23.7	21.1	18.1	20.97	10.6	7.9	3.0	7.2
	control	22.5	20.4	17.8	20.23	9.8	6.9	2.7	6.4
	<i>difference</i>	<i>1.2</i>	<i>0.7</i>	<i>0.3</i>	<i>0.73</i>	<i>0.88</i>	<i>1</i>	<i>0.3</i>	<i>0.73</i>

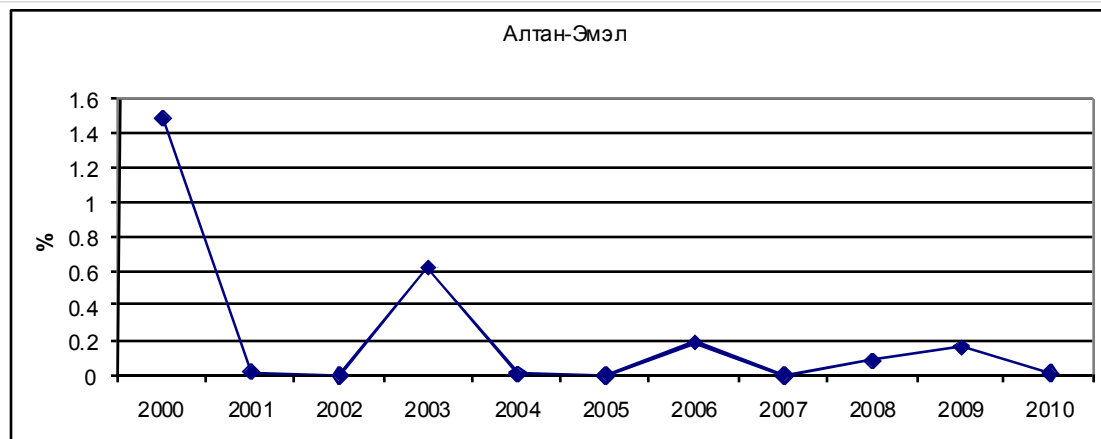
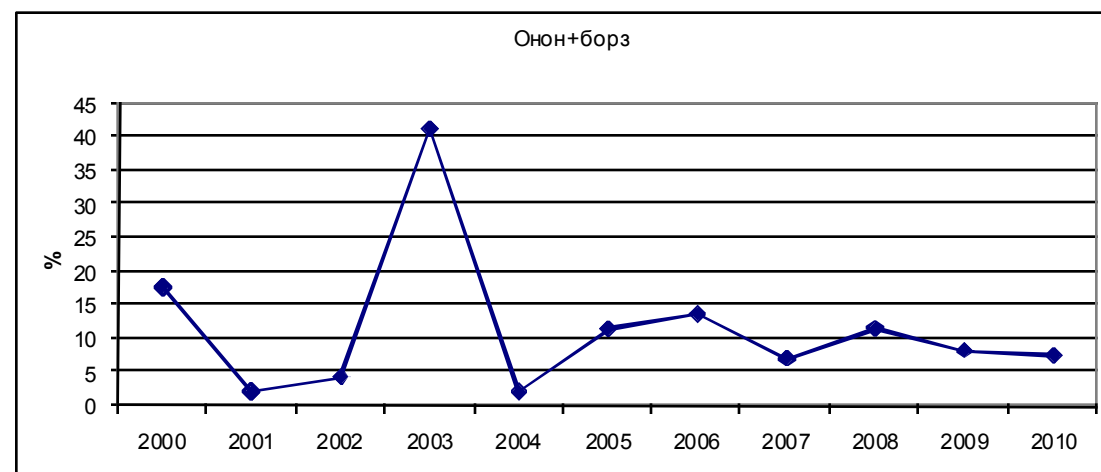
Burned areas in adjacent districts of Russia, Mongolia and China



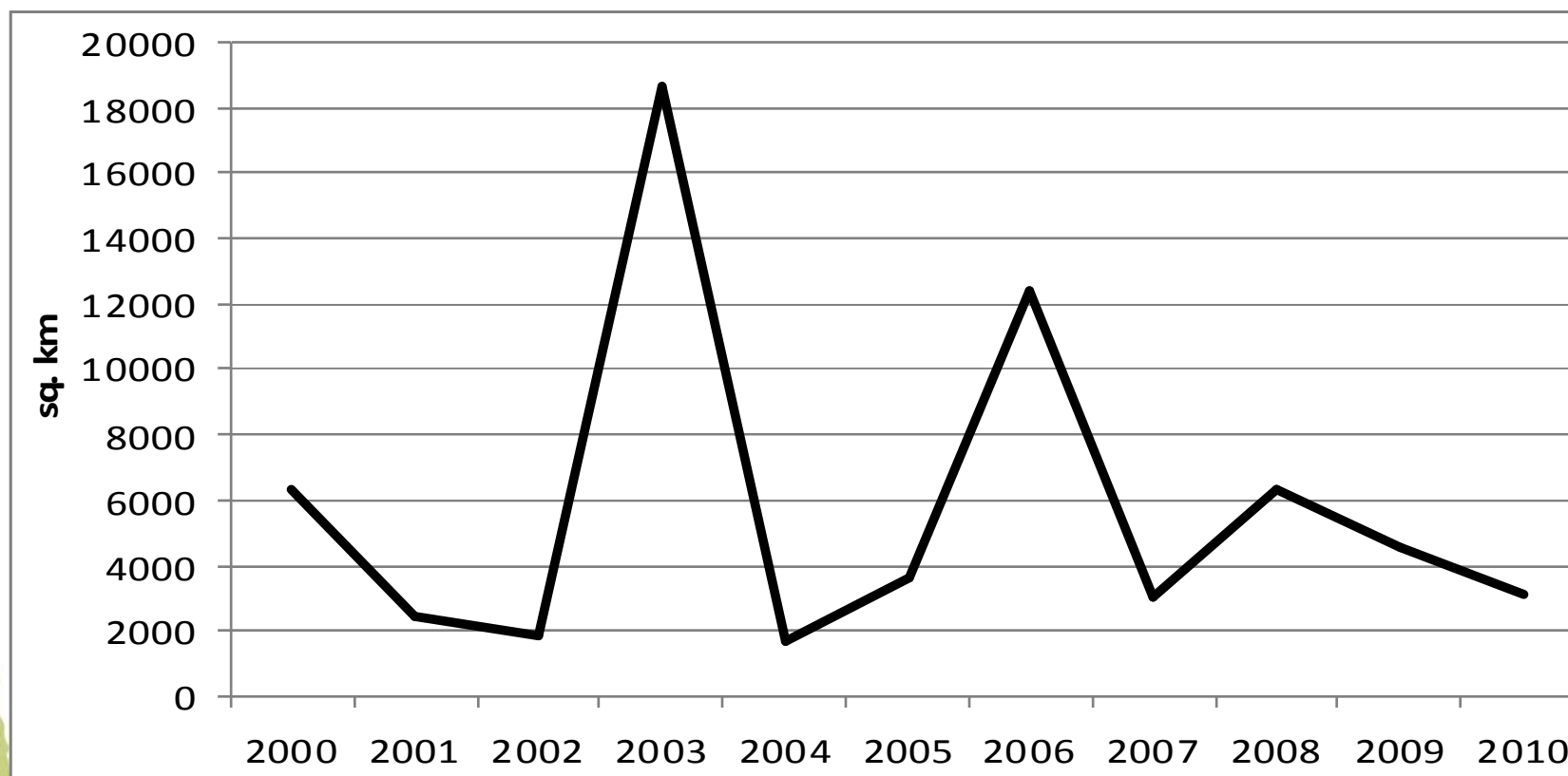
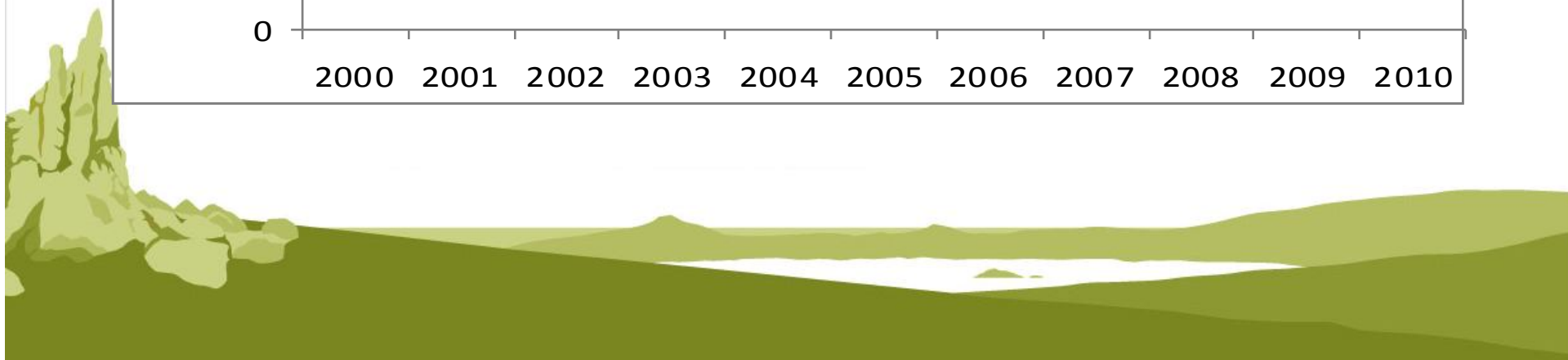
Steppe fires area in 2000-2010 in transboundary Russian-Mongolian-Chinese region

	Dornod Aimag	Onon and Borzya districts	Shine- Barga-Quji Hoshuu
km²	96611.0	18610.6	656.5
%	78.3	126.2	2.6

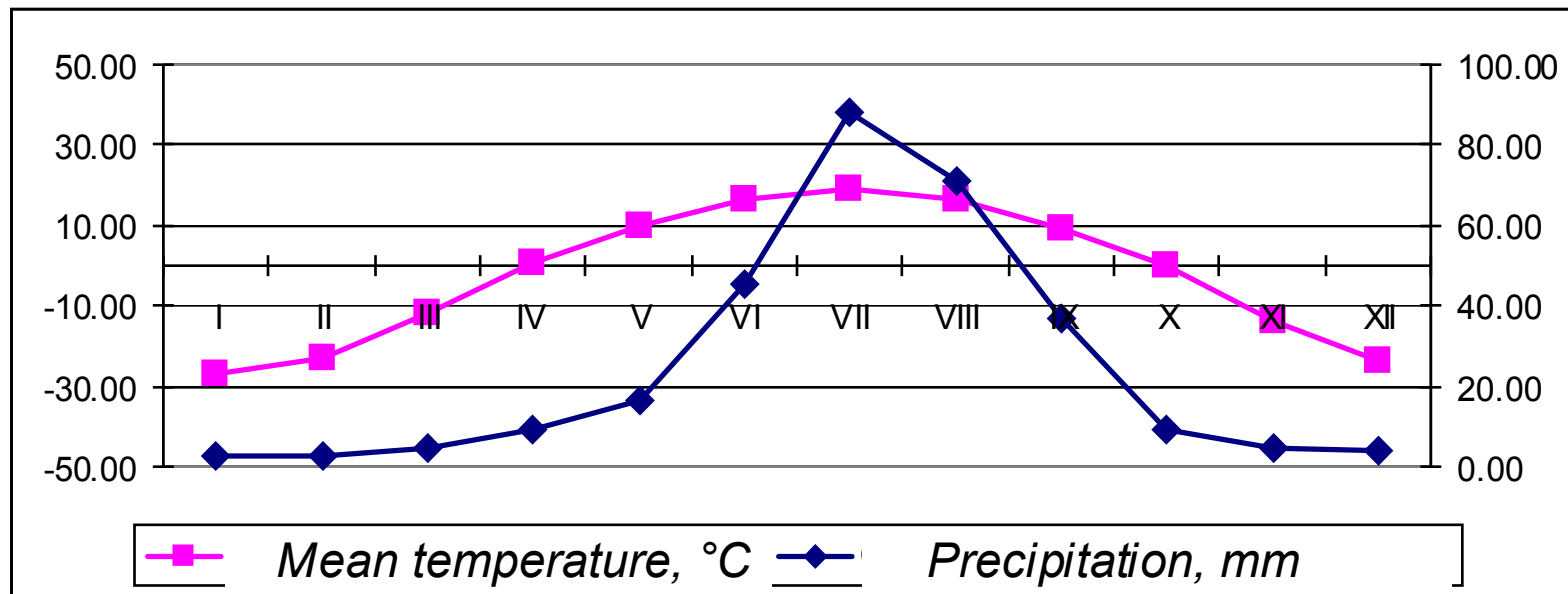
Динамика
площадей пожаров
в российской,
монгольской и
китайской частях
Даурии на примере
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процентах к
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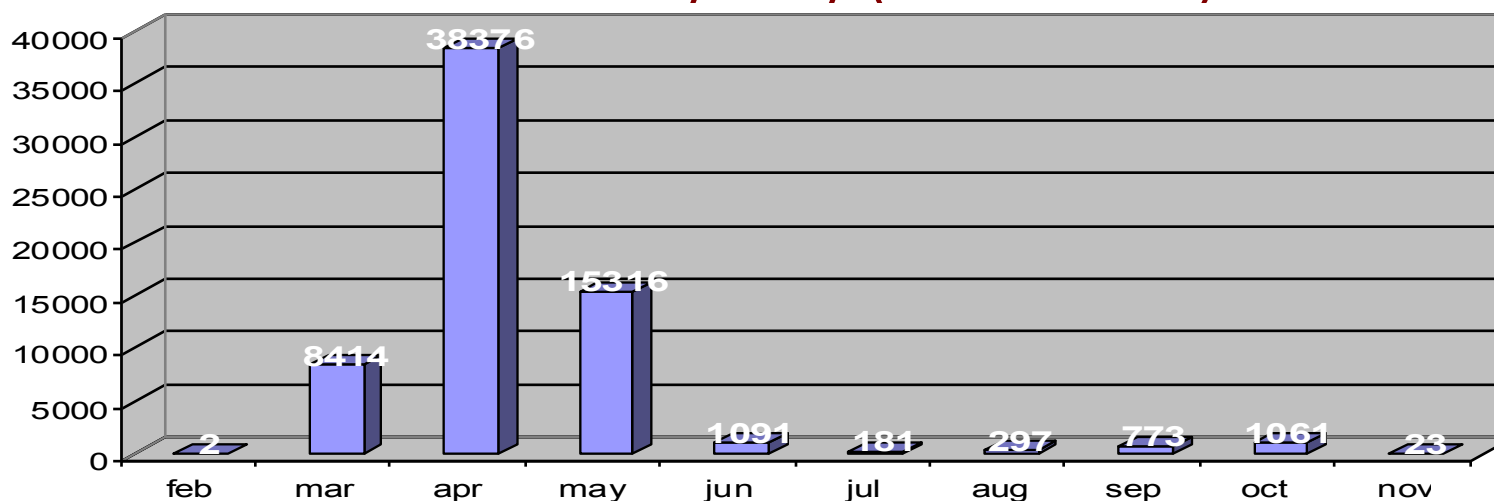
Burned areas at Dauria in 2000-2010



Climagramm for Borzya town (Zabaikalsky kray, Russia)



Distribution of fires number in 9 districts in steppe zone in Zabaikalsky kray (2000-2010)



Conclusions

Steppe fires in Dauria have anthropogenic origin. The Russian part of transboundary region is leading in percentage of burned areas.

In different parts of the region synchronic peaks of fires are observed in dry years consequent to the wet ones during which high quantity of mortmass accumulates.

- Fires have seasonal character with peak in spring.
 - Fires influence on phytoceonoses consists of mortmass elimination, damaging and fragmentation of tufts, damaging of bush brunches.
 - Lack of mortmass and decreasing of green mass changes soil temperature regime in non-favorable for plant direction: mean temperatures and temperatures amplitude increase.
 - Fires enforce soil erosion that causes tufts and roots denuding.
 - Observed effects keep for three years and more.
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