



**The Seventh Session of East Asian winter Climate  
Outlook Forum**

# **RECENT EXTREME EVENTS IN MONGOLIA**

**Doljinsuren Myagmar**

Weather Forecasting Division

National Agency of Meteorology and Environmental Monitoring

Ulaanbaatar, Mongolia

05-Nov-2019



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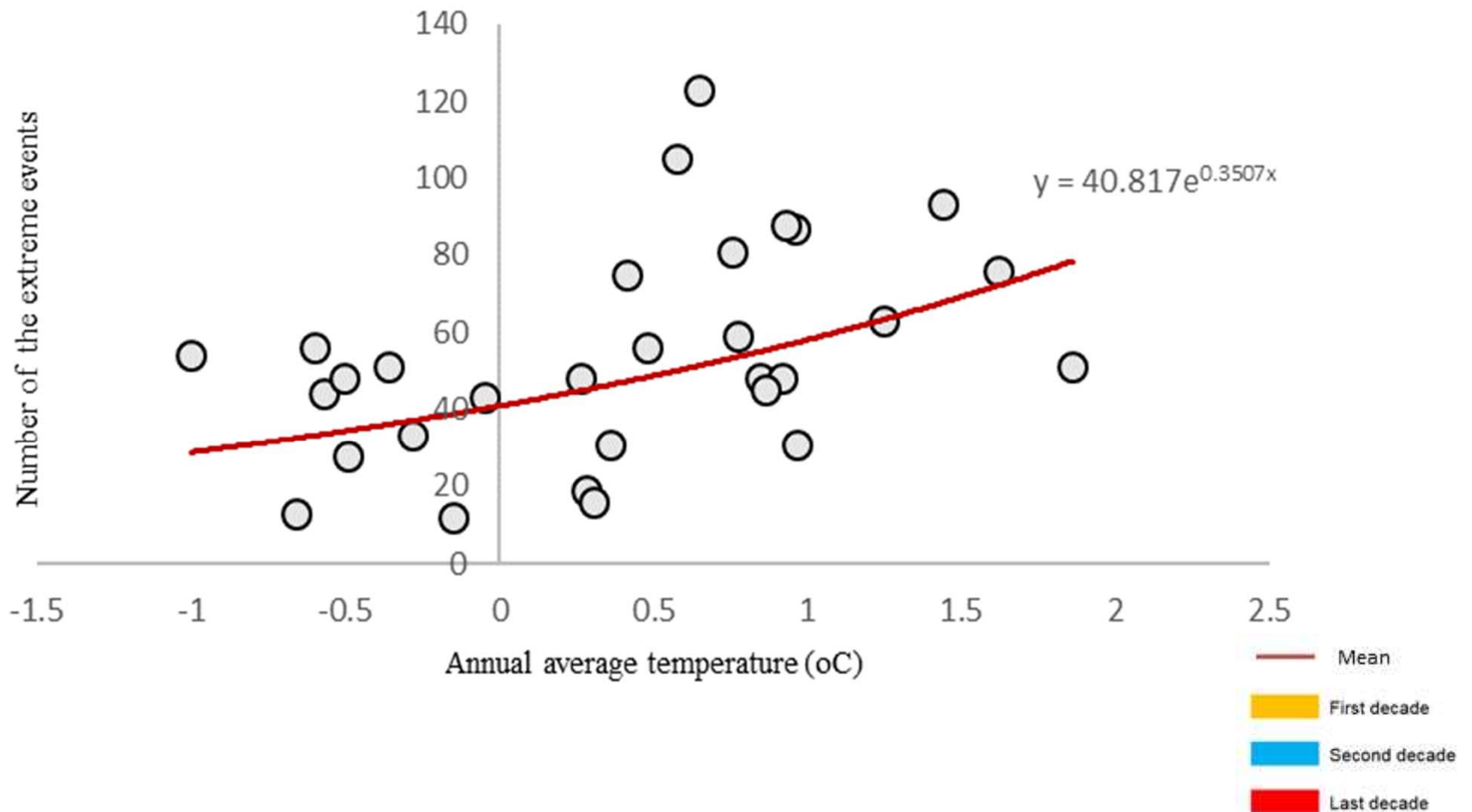
# OUTLINE

- Trends in the extreme weather events
- Types of the extreme weather
- Losses from the extreme weather events
- Extreme weather events in 2018 and 2019
- Summary



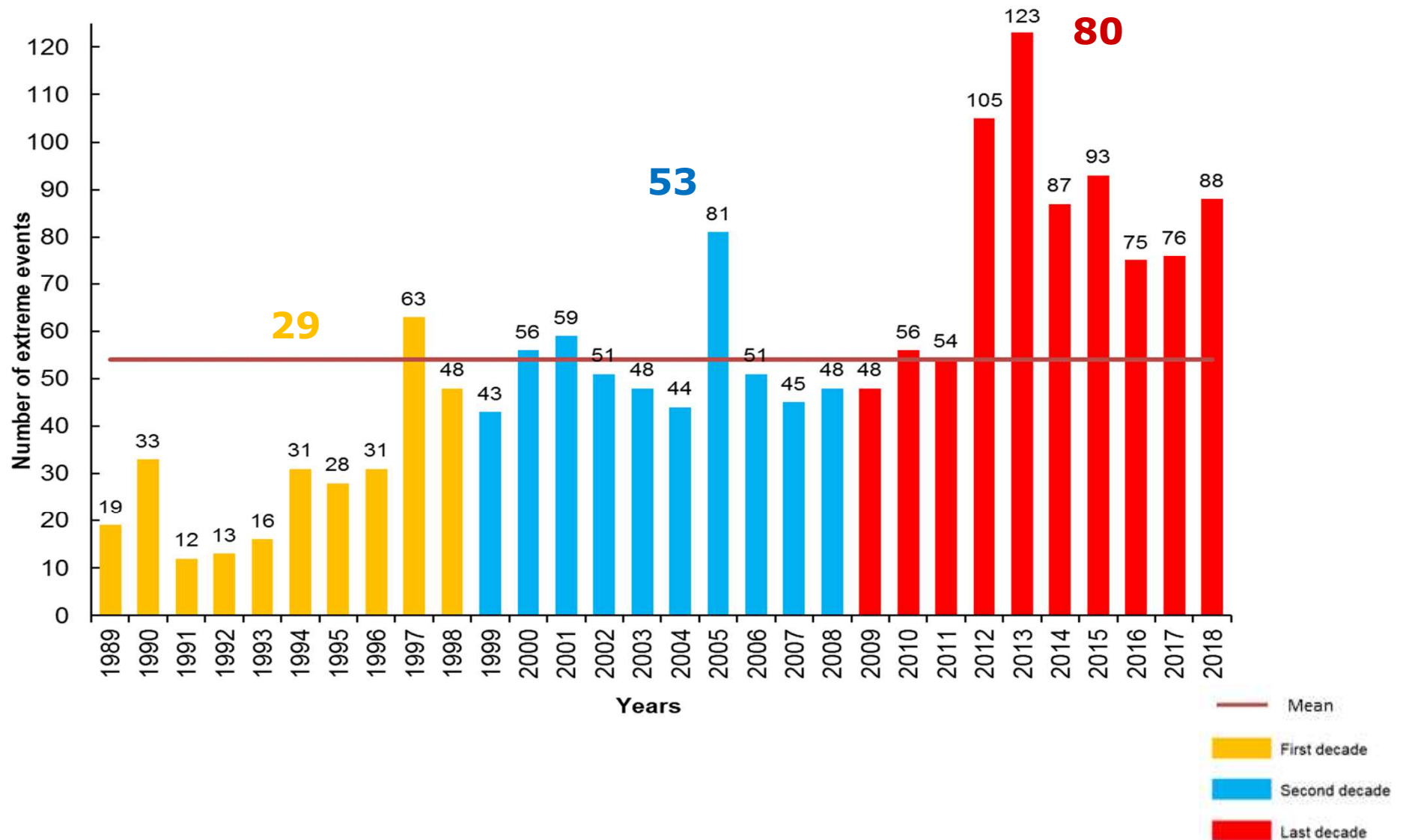
# Trends in the extreme events in Mongolia

Correlation between annual average temperature and number of the extreme events in Mongolia



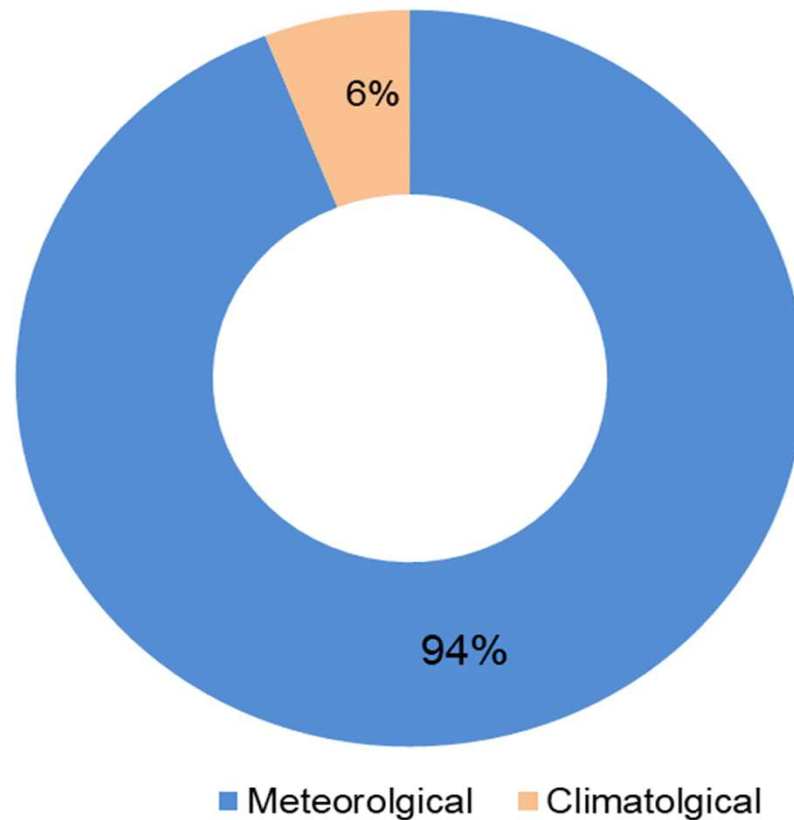


## Trends in the extreme events in Mongolia





## Types of the extreme events in Mongolia



### **Meteorological**

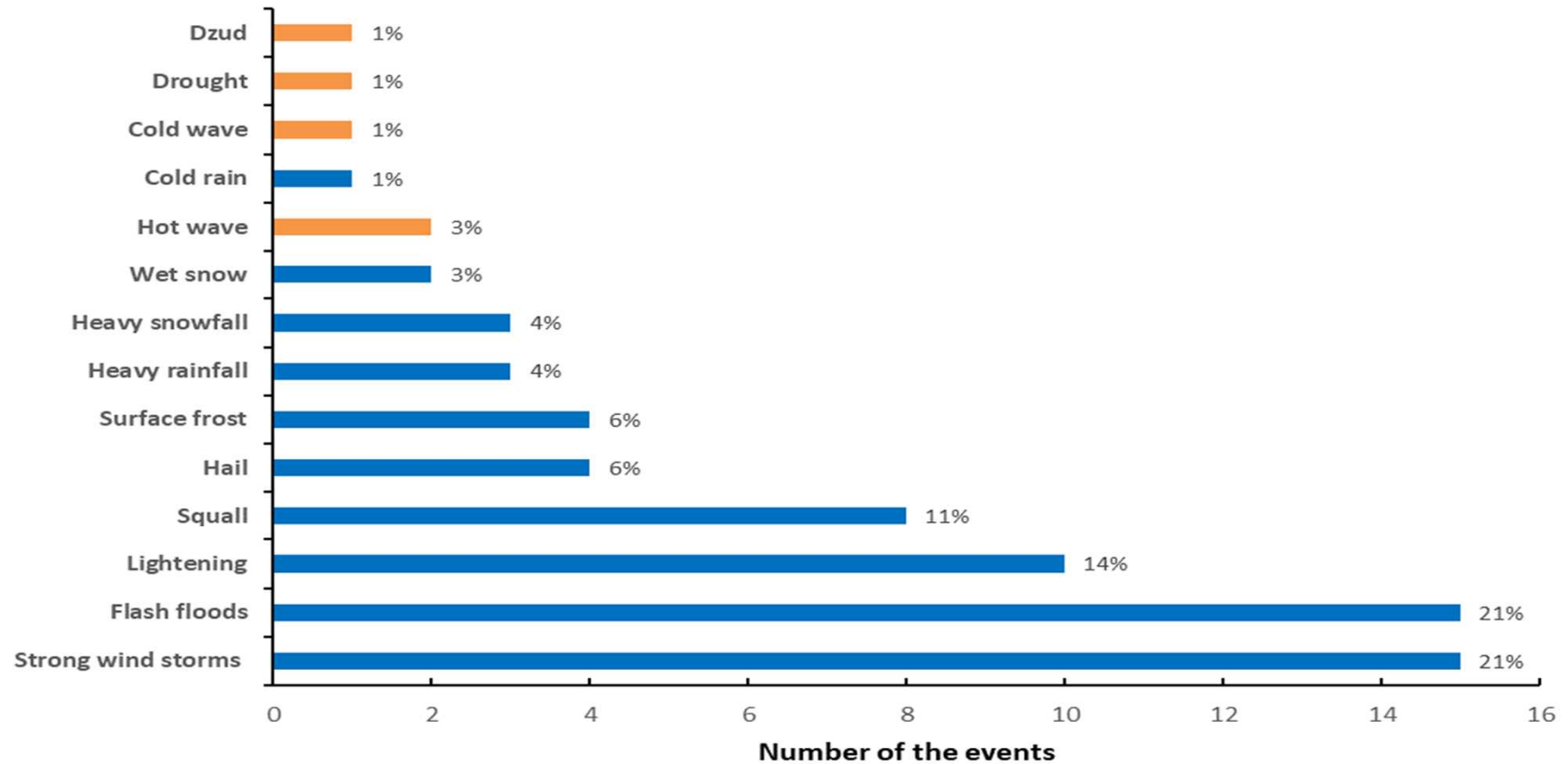
Strong wind storms, heavy snow and rain, flash flood, lightning and so on.

### **Climatological**

Drought, dzud, heat and cold waves

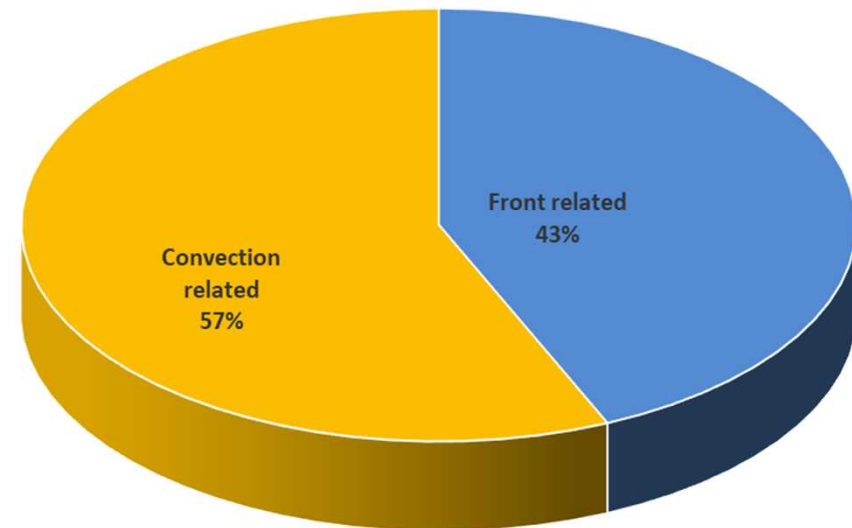
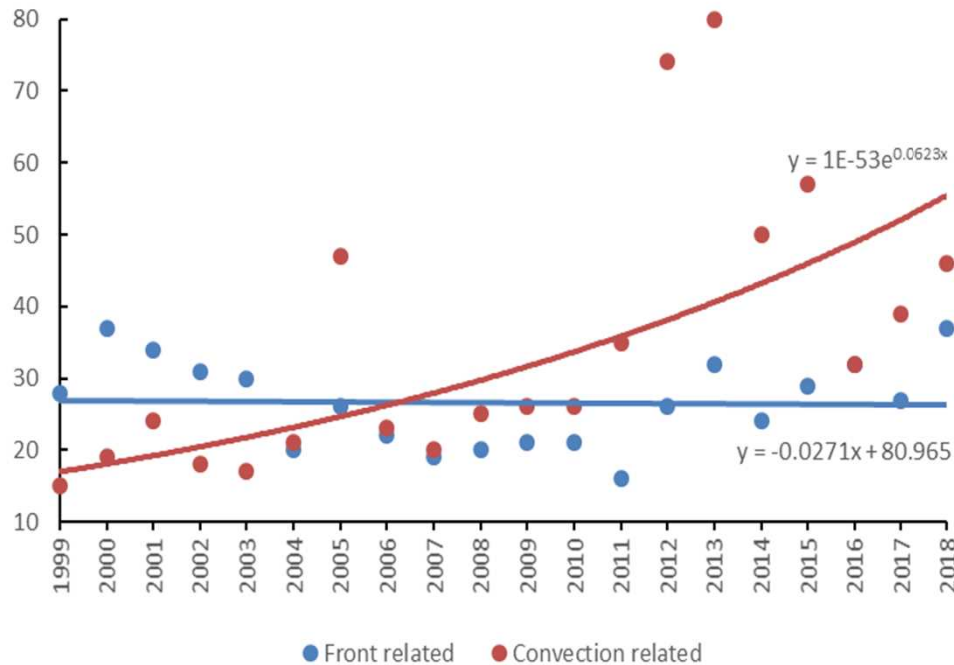


## Types of the extreme events in Mongolia





## Types of the extreme events in Mongolia

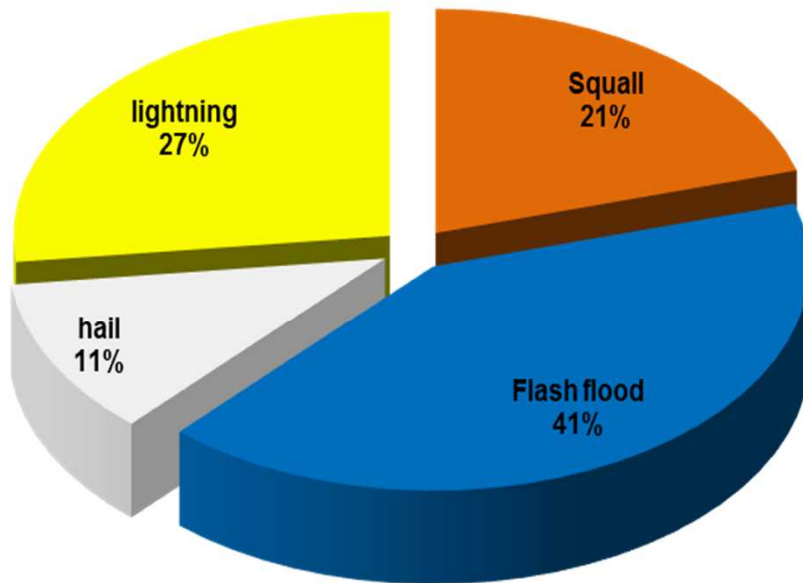


In Mongolia, convective phenomena, which persist comparatively for a short time (1-4 hours) and cover small areas are becoming more common, and they have tripled in the last decade.

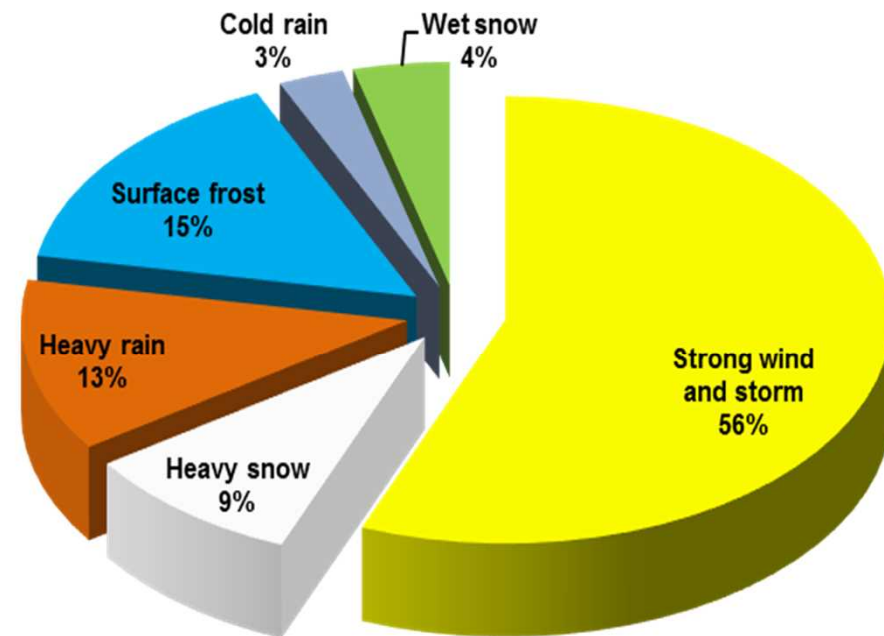


## Types of the extreme events in Mongolia

Convective related



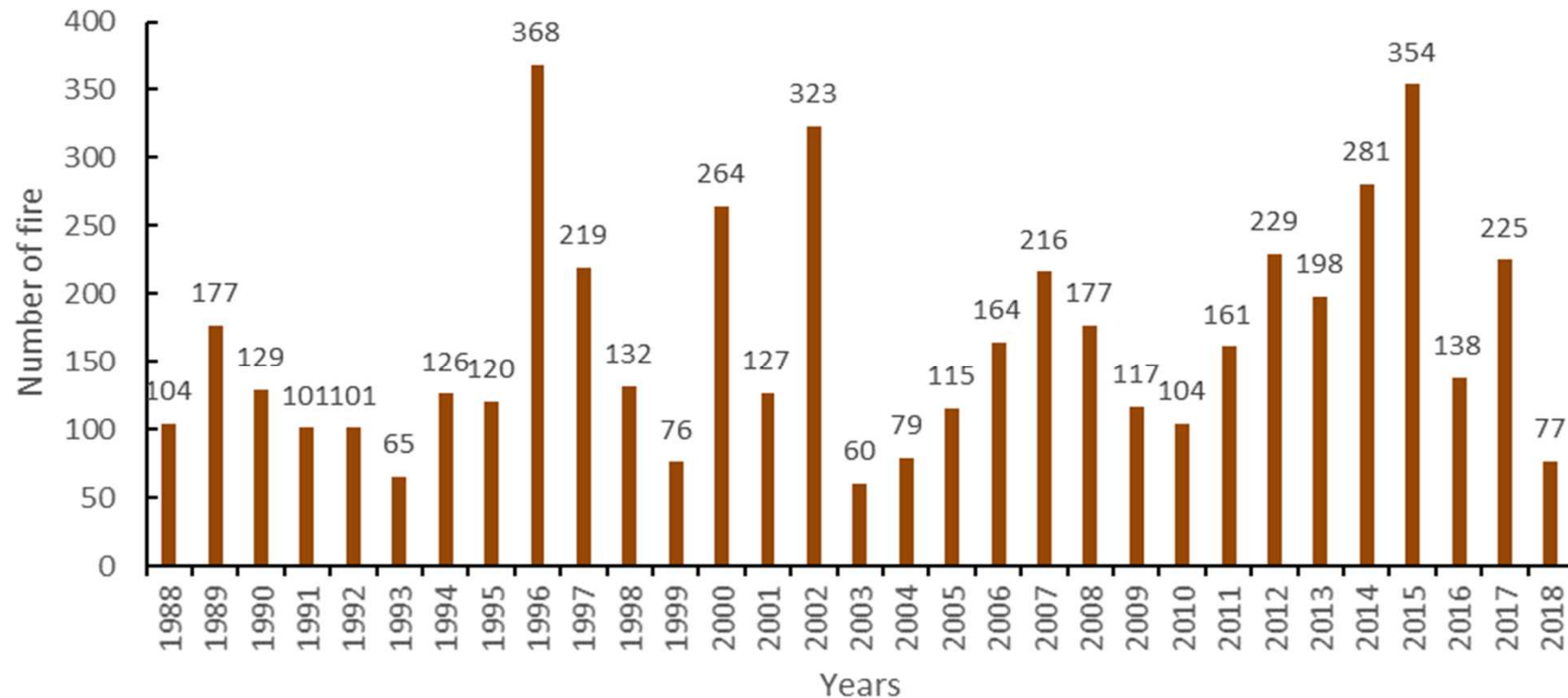
Atmospheric front related







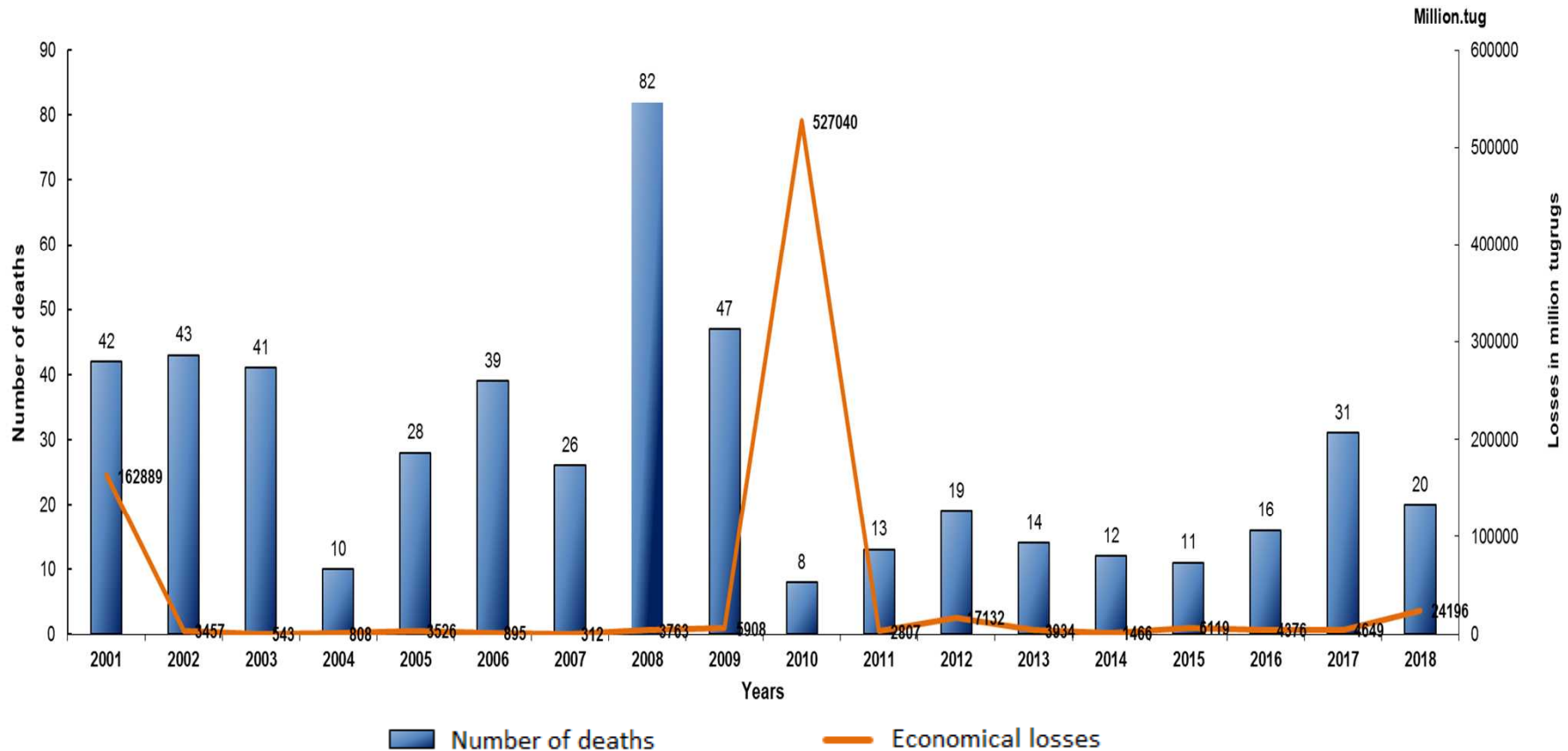
## Forest and wild fire Mongolia



Forest and wild fires report 162 times a year, however, they can have caused by human activity, although air and ground dryness is the main cause of these fires. 1996, 2002, 2007 were drought, and spring of 2014 and 2015 were comparatively dry, therefore, fire occurred much more than that in other years.



# Losses from the extreme events

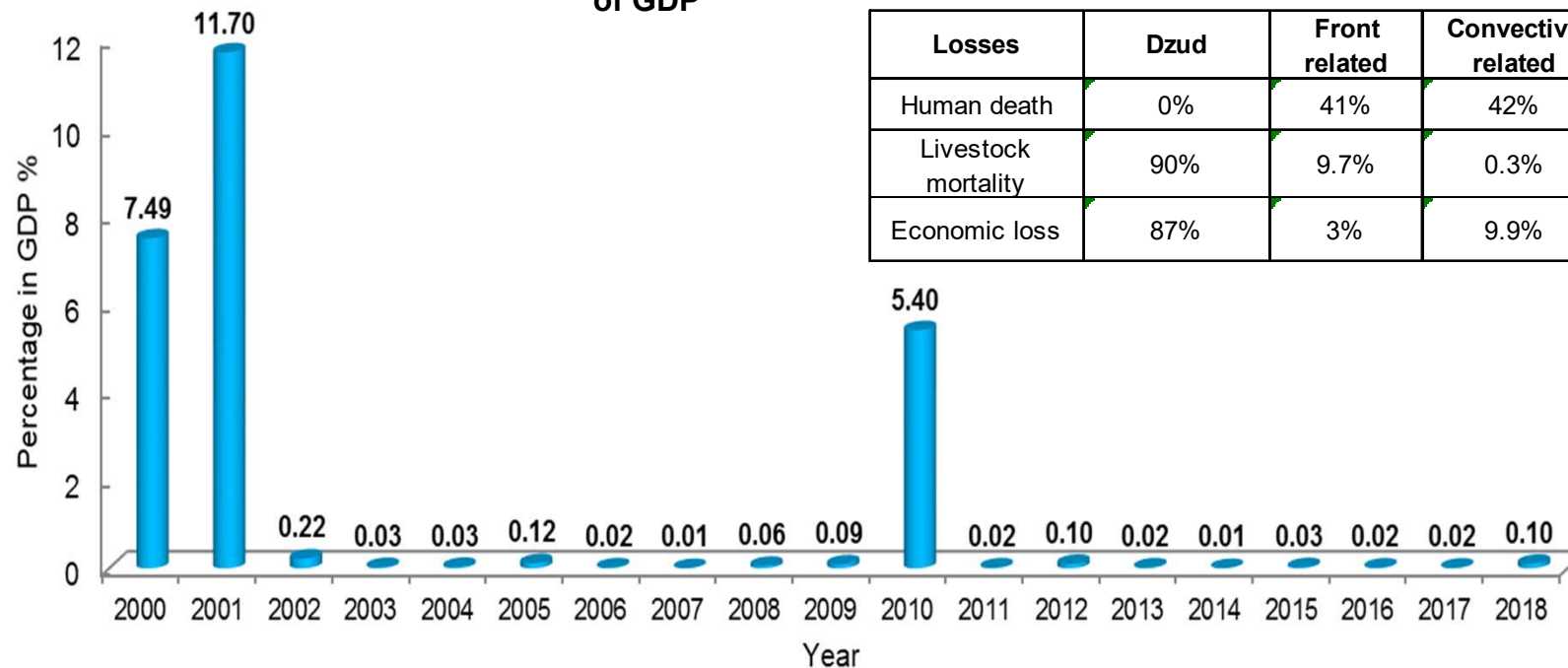


Although the public was pre-informed 93% of the extreme events by NAMEM in the last 20 years, **502** people were killed, livestock mortality totaled **29.6** million, and total damage amounted to **672.2** million USD. The 2009-2010 dzud affected 81% of the total territory. Nationwide, 22.4 percent of total livestock were lost and there was a damage of 388.7 million USD. However, 2008 was the worst year for human death caused by weather disasters, in the last 10 years, the number of victims have been decreased by 2.5 times.



# Losses from the extreme events

Weather disaster losses as a percentage of GDP



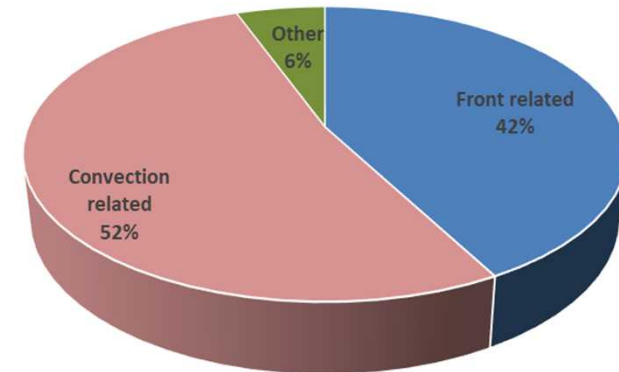
Losses	Dzud	Front related	Convective related	Other
Human death	0%	41%	42%	17%
Livestock mortality	90%	9.7%	0.3%	0%
Economic loss	87%	3%	9.9%	0.1%

In 2000, 2001 and 2010, as a percentage of GDP, the total damage caused by atmospheric extreme events was 5.4-11.7%, and it could be explained that, in these years large numbers of livestock were lost due to severe drought and dzud.

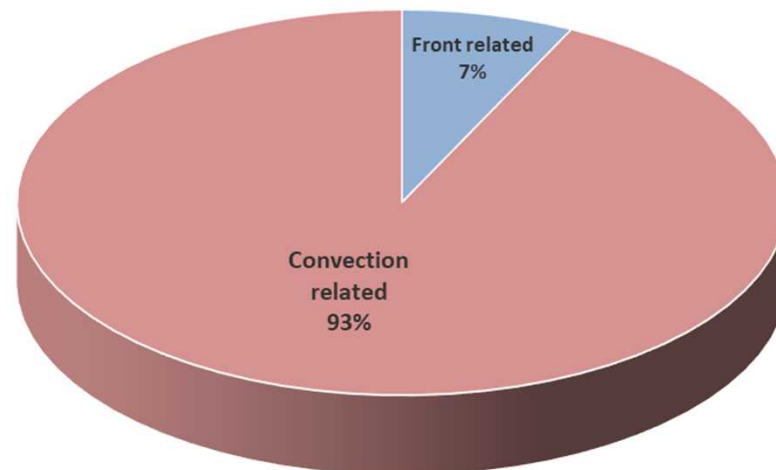


## Weather related disasters in 2018

No	Extreme evetns	Number of events	Killed people	Livestock loss	Economic loss (mill.tugrug)	Agriculture farming filed (hecta)
1	Strong wind, storm	22		4269	1519.0	
3	Heavy rainfall	8	2	2310	234.6	
4	Surface frost	7				
5	Squall	4			0.3	
6	Flash flood	27	6	3351	19557.5	15
7	Hail	9		996	2872.0	4001
8	Lightening	6	5	1		
9	Ice breaking	3	7			
10	Spring flood	2			12.4	
	<b>Total</b>	<b>88</b>	<b>20</b>	<b>10927</b>	<b>24195.7</b>	<b>4016</b>



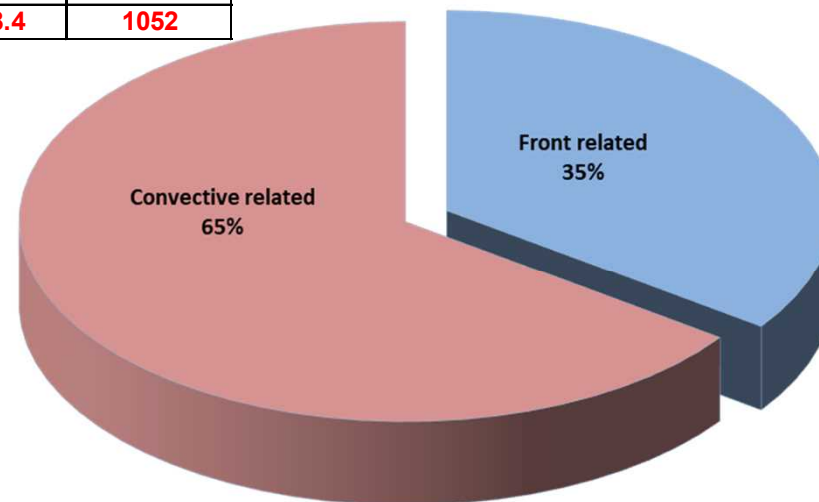
## Economical losses in a percentages





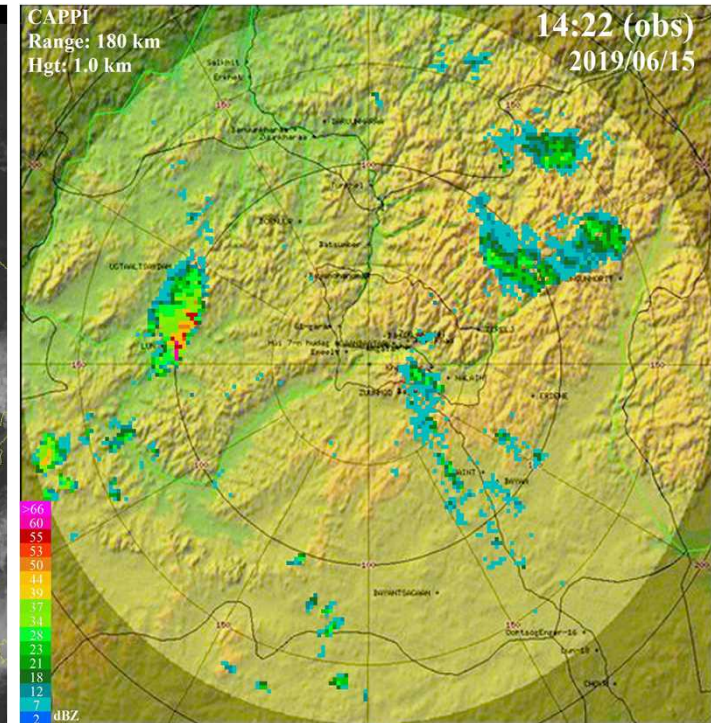
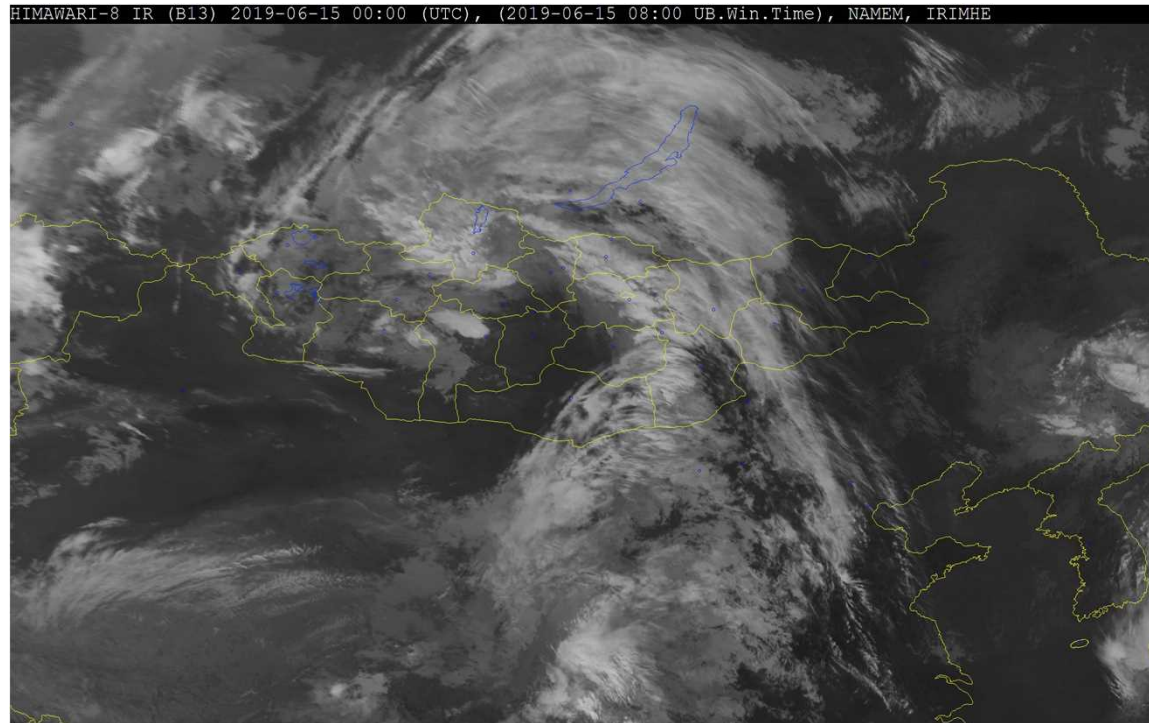
## Weather related disasters in 2019, Mongolia

No	Extreme events	Number of events	Killed people	Livestock loss	Economic loss (mill.tugrug)	Agriculture farming filed (hecta)
1	Strong wind, storm	14	6	21796	492.6	
	Heavy snow	1				
3	Heavy rainfall	9		114	109.1	
4	Surface frost	6				
5	Squall	13			17.5	
6	Flash flood	12	7	10		98
7	Hail	13				954
8	Lightening	17	2	1704	1448.0	
9	Ice breaking	5	4			
10	Spring flood	2			1.2	
	<b>Total</b>	<b>92</b>	<b>19</b>	<b>23624</b>	<b>2068.4</b>	<b>1052</b>



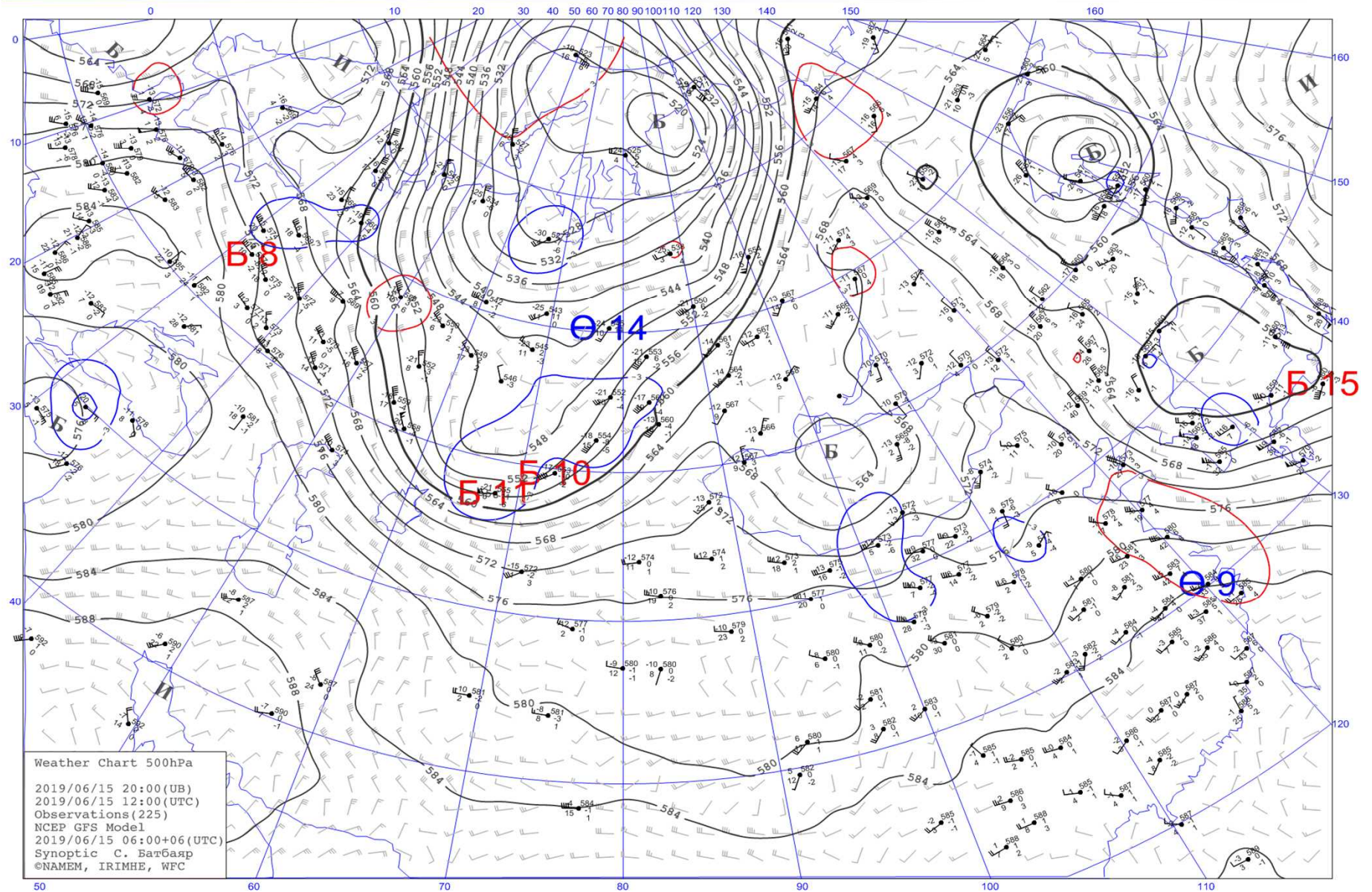


## A severe flash flood on 15th June, 2019



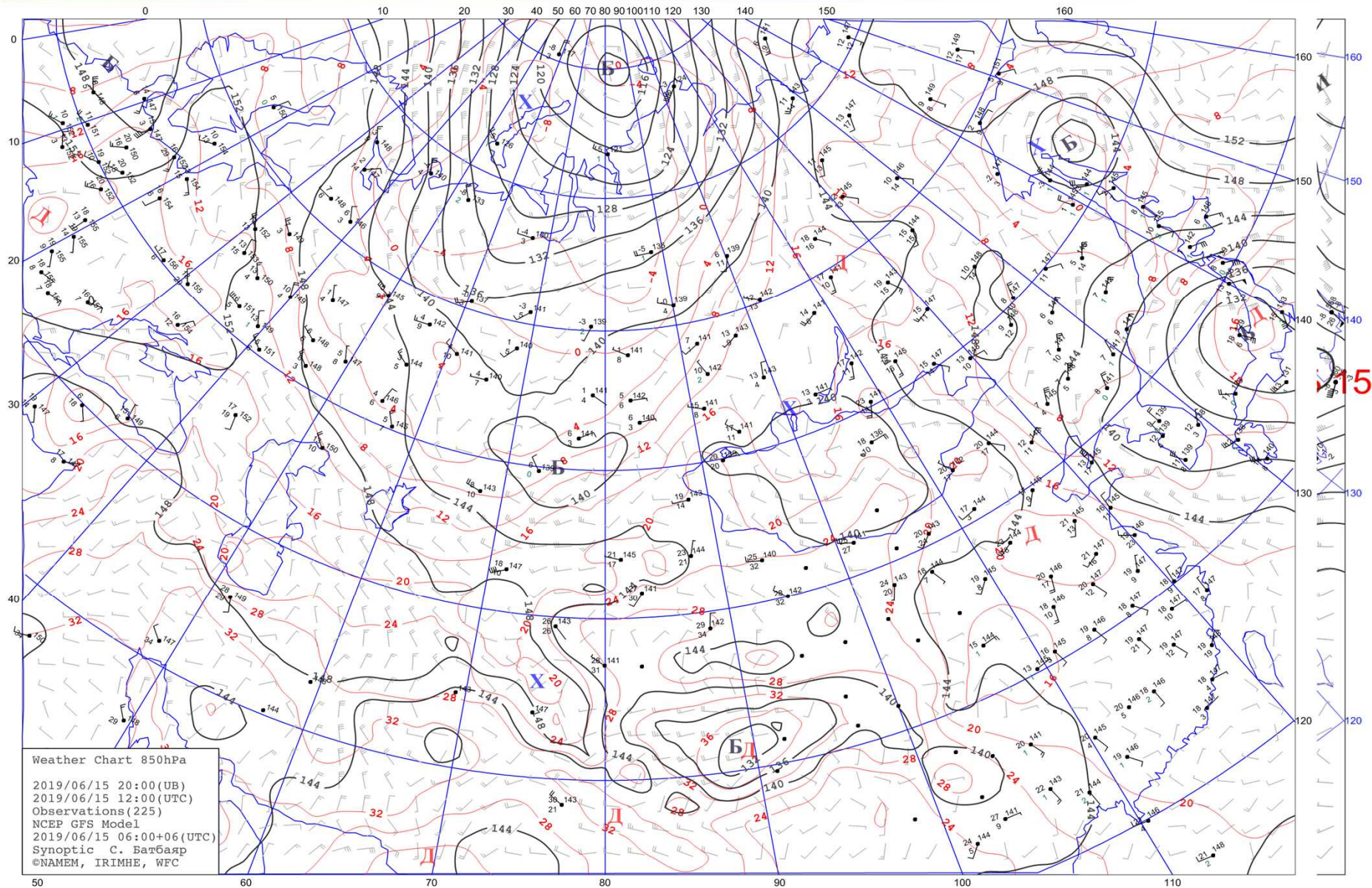


## A severe flash flood on 15th June, 2019





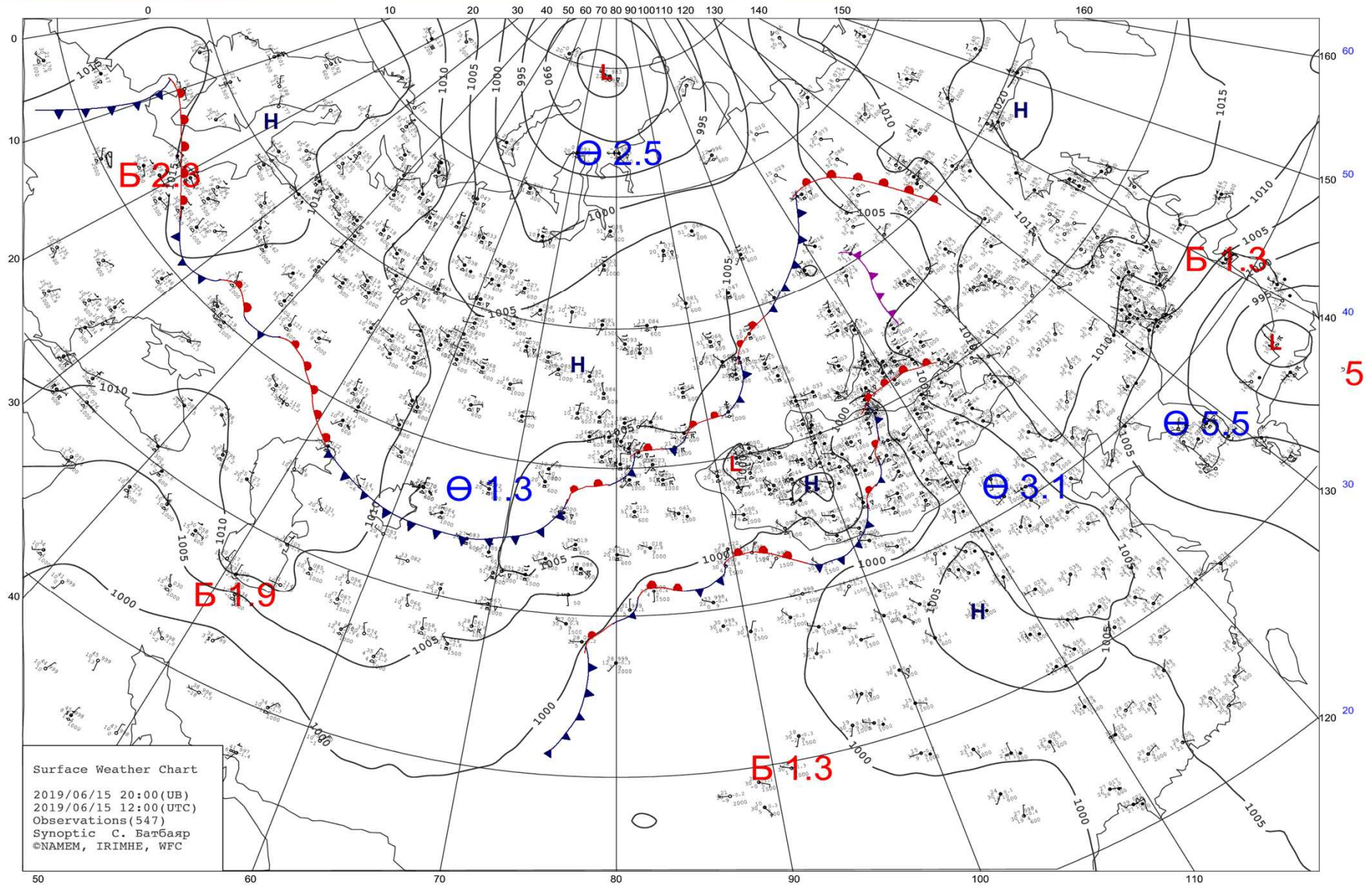
## A severe flash flood on 15th June, 2019







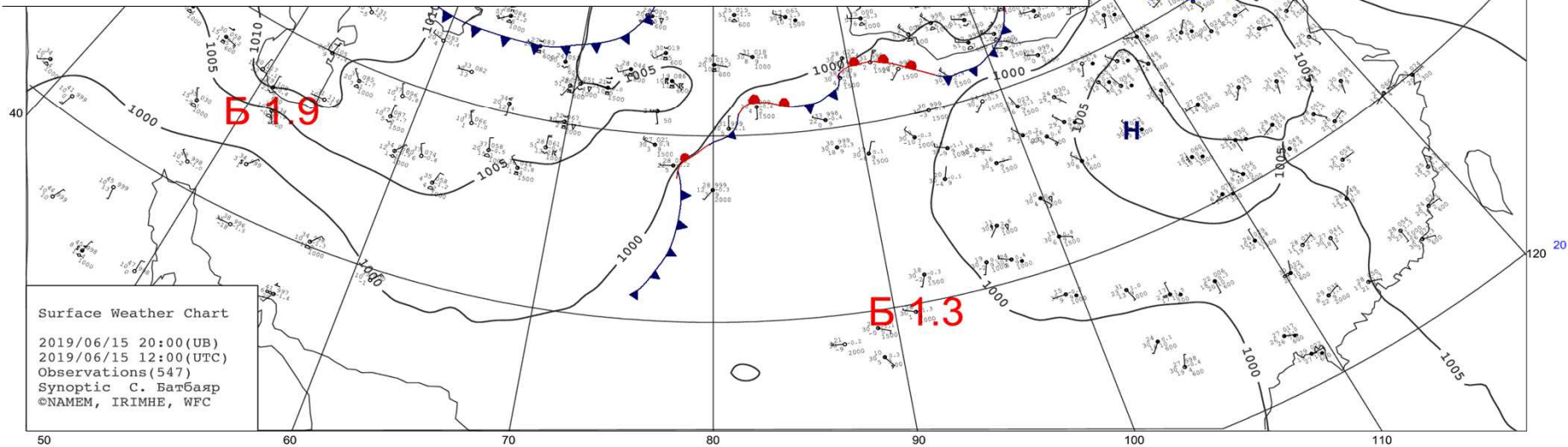
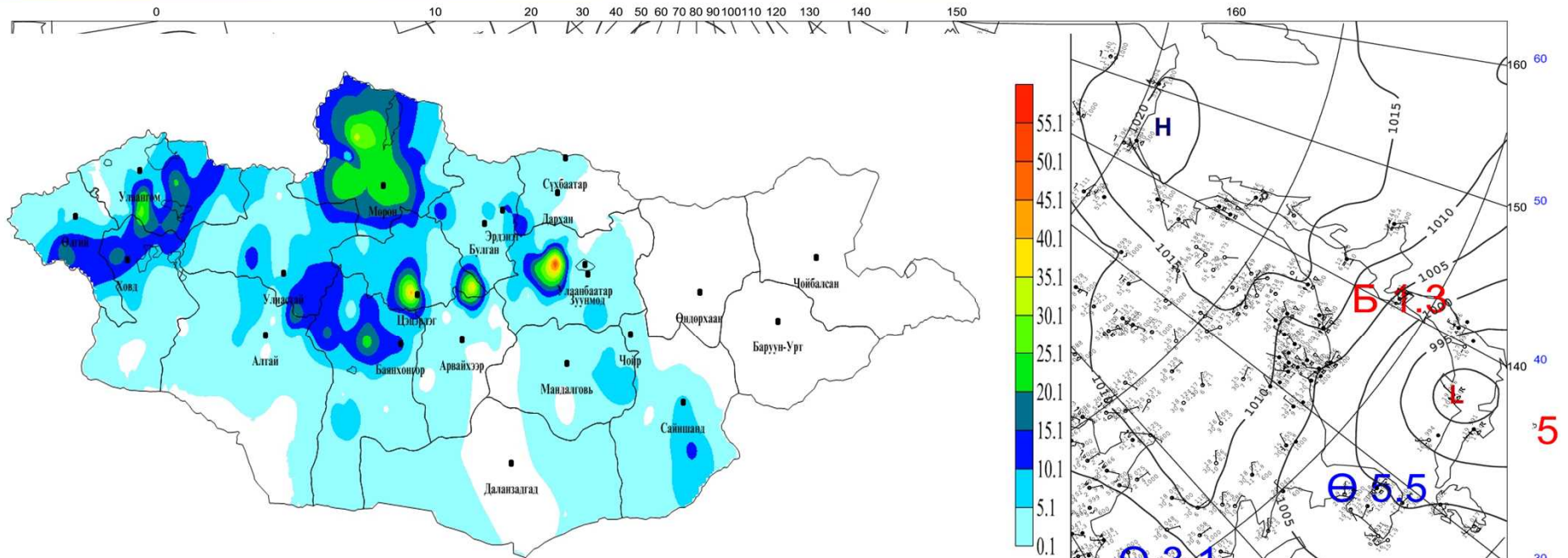
# A severe flash flood on 15th June, 2019



Surface Weather Chart  
2019/06/15 20:00 (UB)  
2019/06/15 12:00 (UTC)  
Observations(547)  
Synoptic С. Батбаяр  
©NAMEM, IRIMHE, WFC

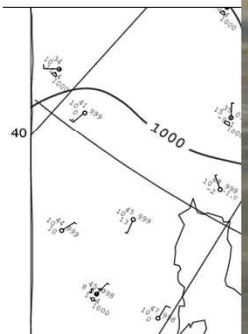
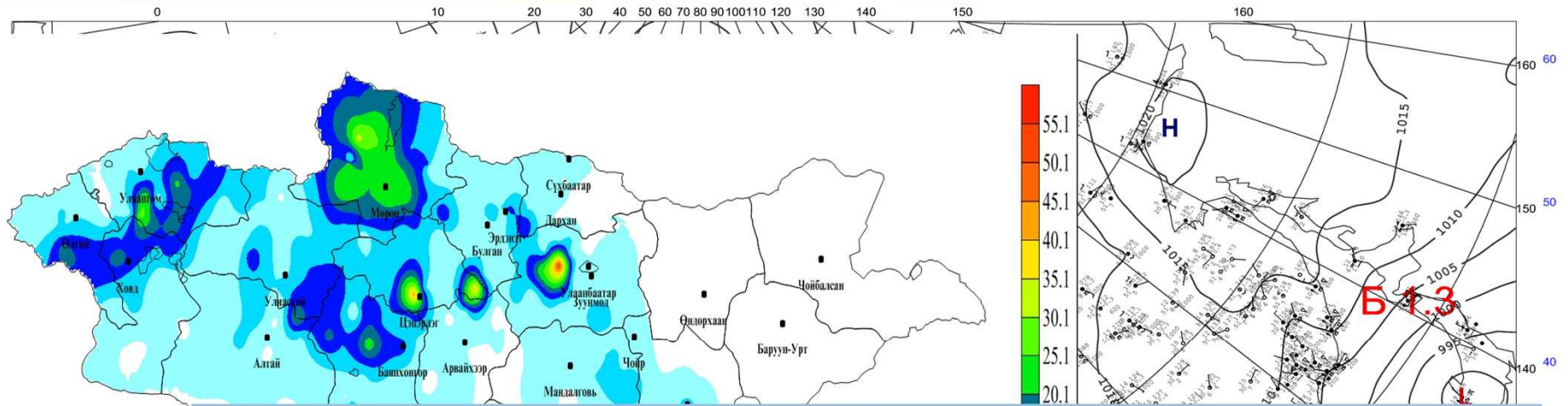


# A severe flash flood on 15th June, 2019





# A severe flash flood on 15th June, 2019



Surface Weather Chart  
 2019/06/15 20:00 (UTC)  
 2019/06/15 12:00 (UTC)  
 Observations(547)  
 Synoptic C. Батбаяр  
 ©NAMEM, IRIMHE, WFO

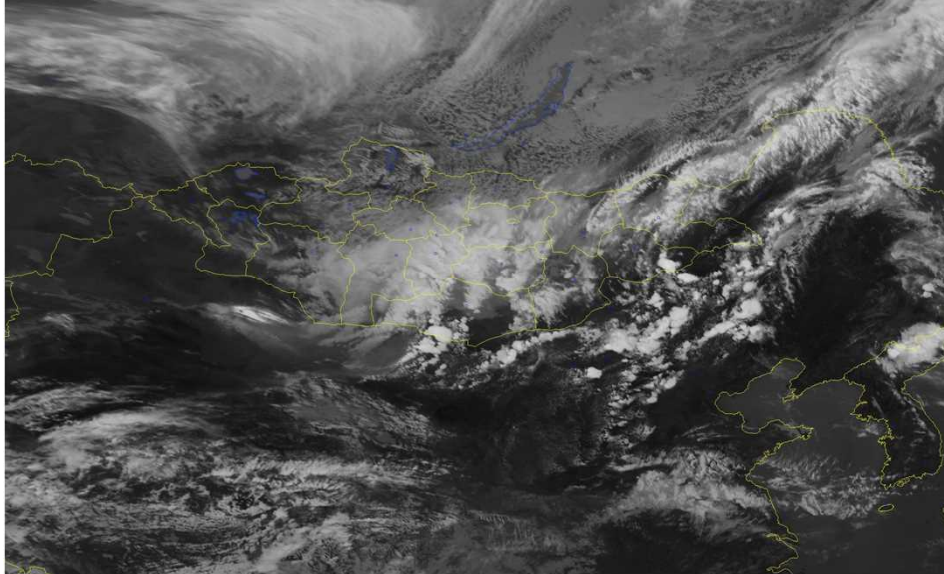
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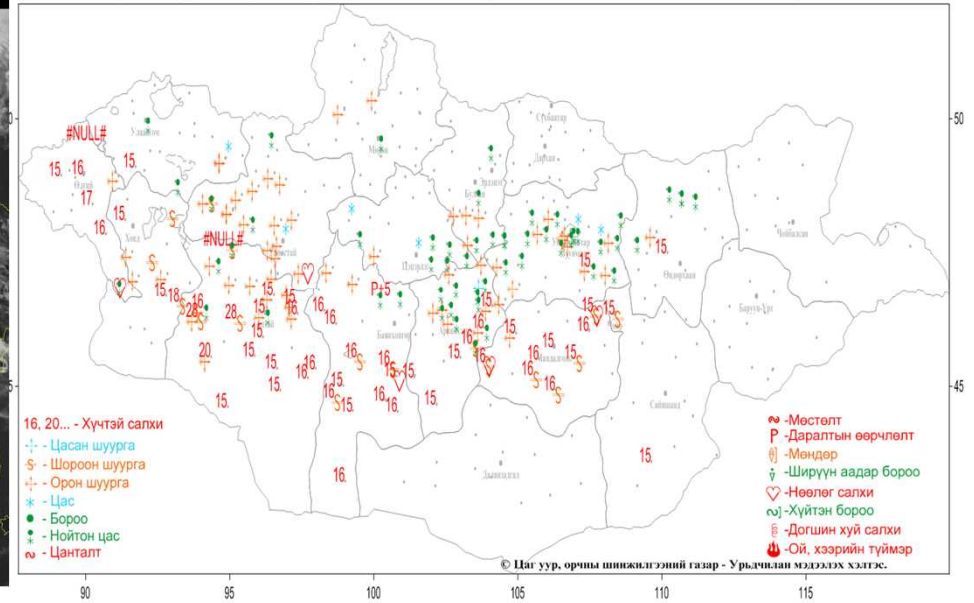


## A disastrous snowstorm on 10-12<sup>th</sup> May, 2019

HIMAWARI-8 IR (B13) 2019-05-11 05:00 (UTC), (2019-05-11 13:00 UB.Win.Time), NAMEM, IRIMHE

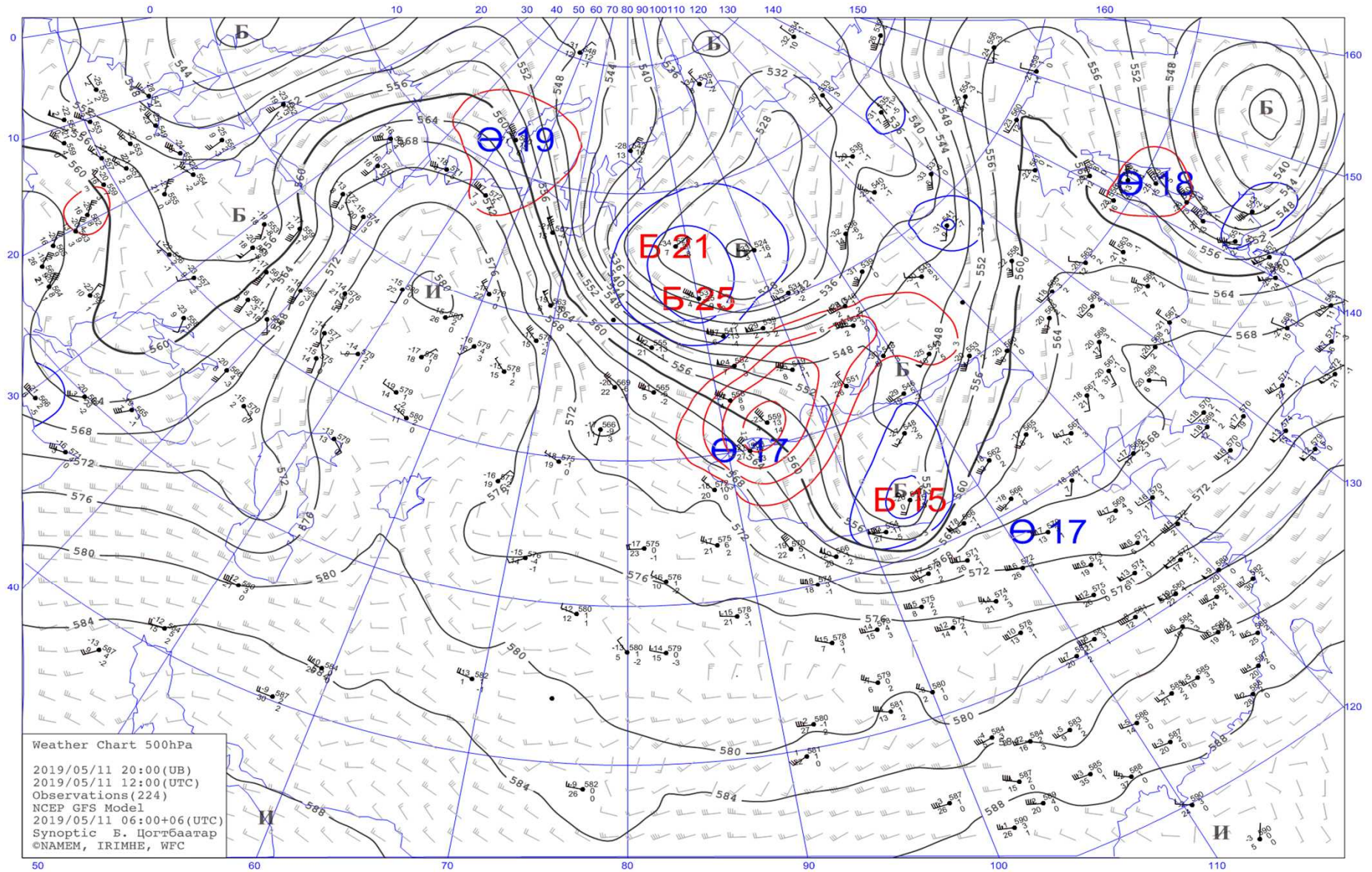


Цаг агаарын аюултай үзэгдлийн мэдээлэл (2019-05-10 08:00 - 2019-05-10 20:00)



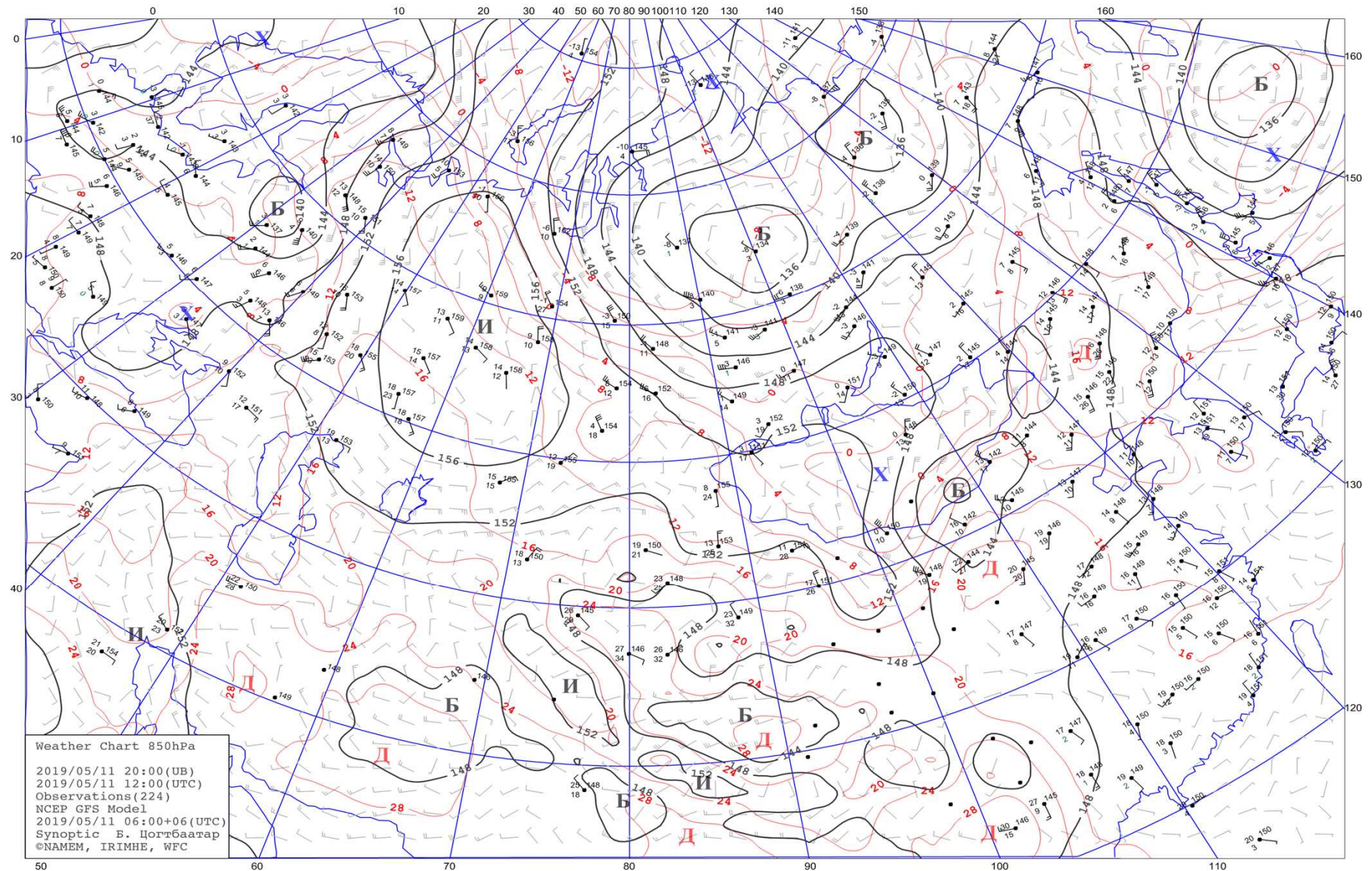


# A disastrous snowstorm on 11-12<sup>th</sup> May, 2019



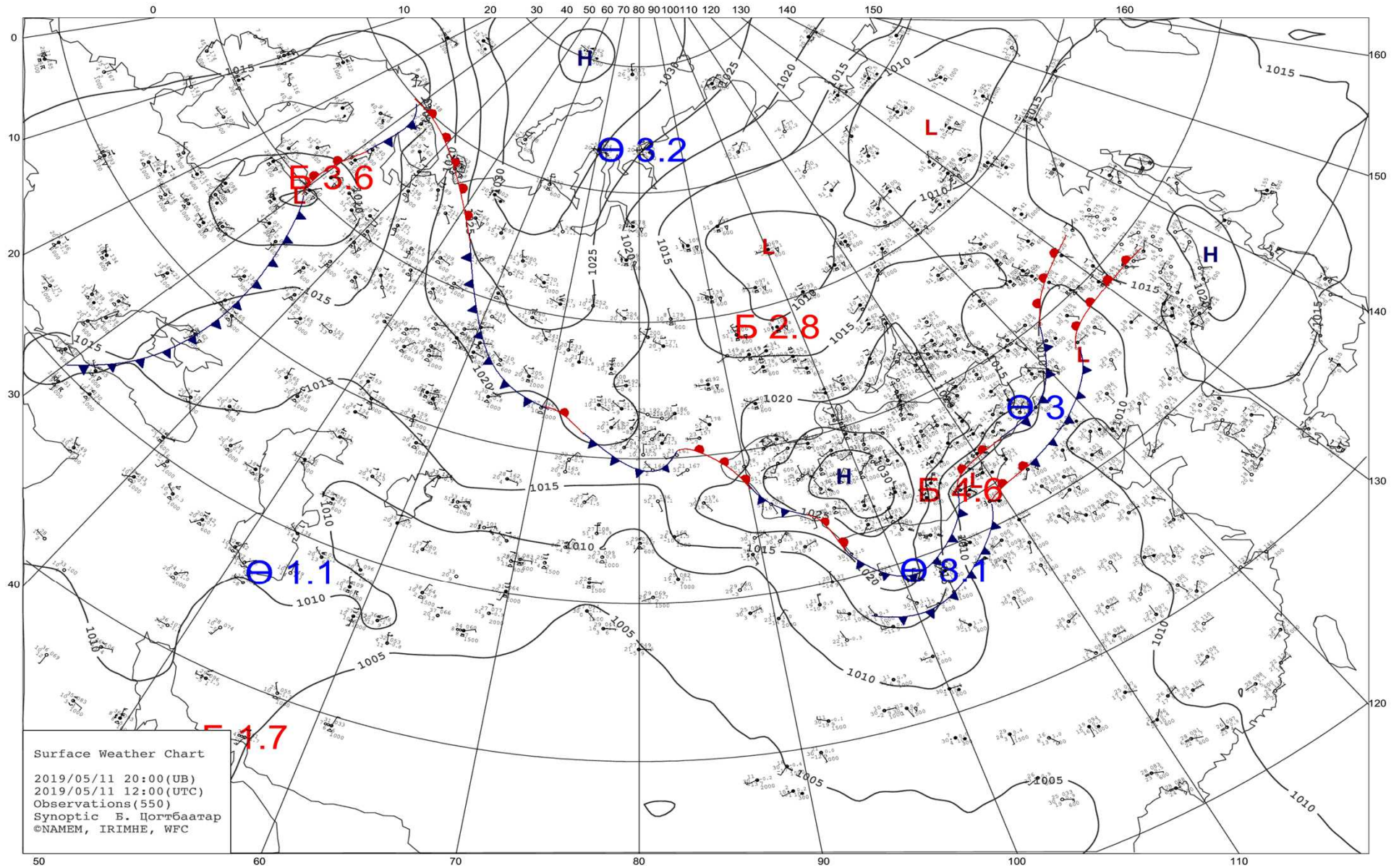


## A disastrous snowstorm on 11-12<sup>th</sup> May, 2019





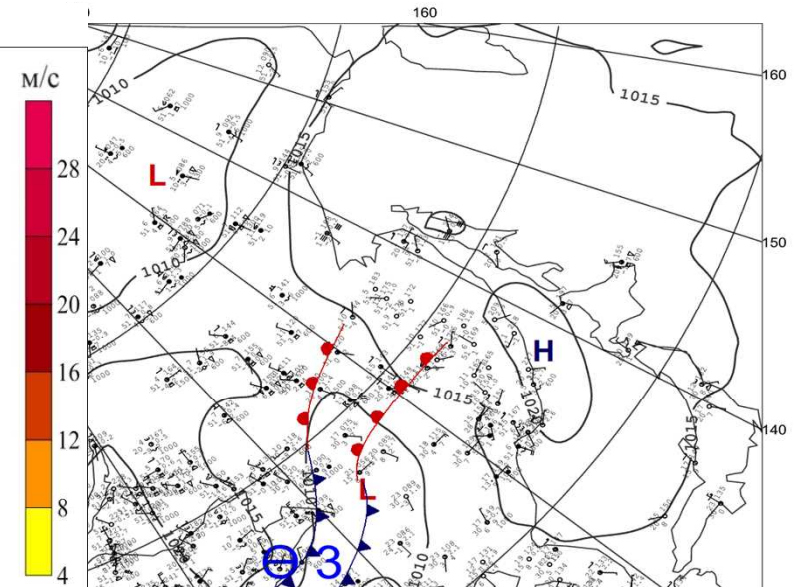
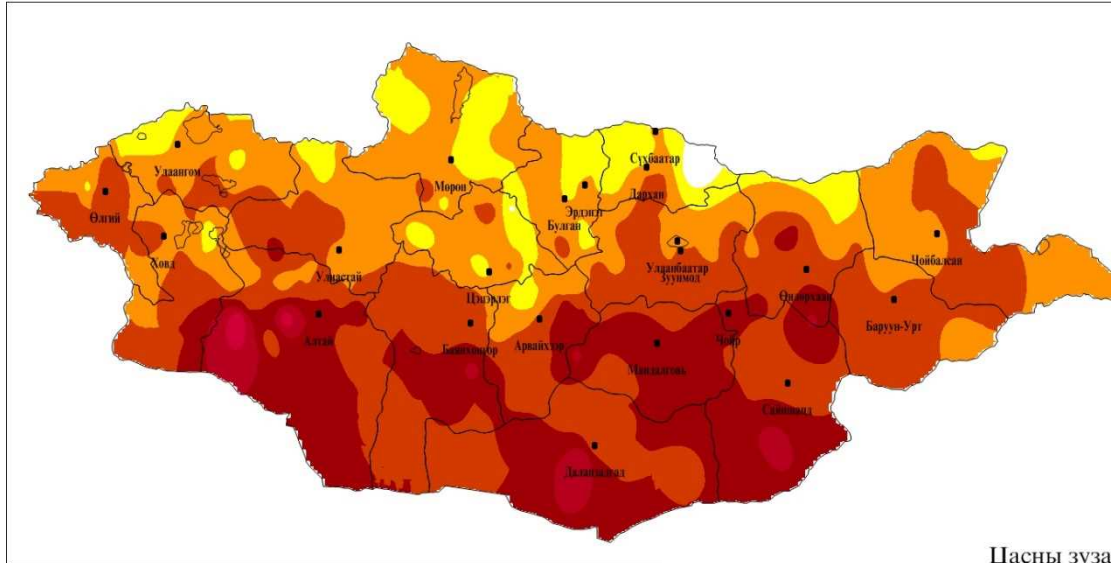
## A disastrous snowstorm on 11-12<sup>th</sup> May, 2019



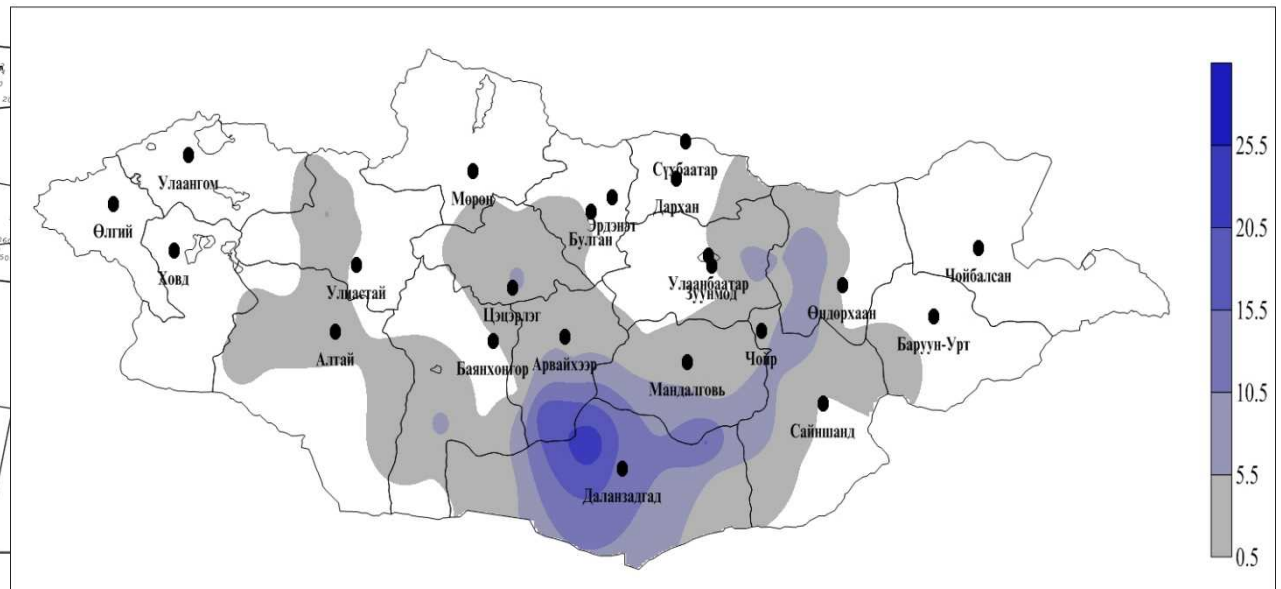
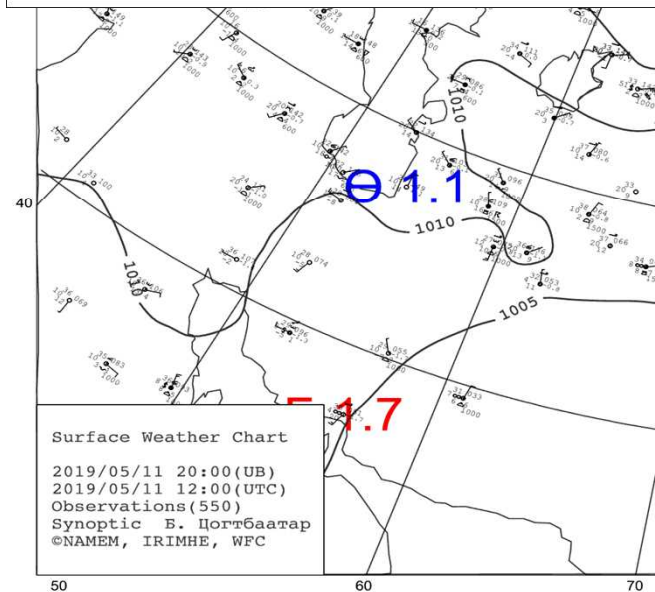


# A disastrous snowstorm on 11-12<sup>th</sup> May, 2019

Салхины хамгийн их хурд (2019/05/10 - 2019/05/12)



Цасны зузаан (2019/05/12)







# SUMMURY

- ❑ An increasing trend of extreme events in Mongolia has a certain degree of relation to the global warming.
- ❑ Extreme weather events, especially convective related phenomena have been increasing and accounted for 57% of all the extreme events.
- ❑ In comparison between last 3 decades the number of extreme event in Mongolia has risen by 1.5-2.7 times in the last decade.
- ❑ In Mongolia, strong wind, storm and thunderstorm are occurred more frequently.
- ❑ Flash floods are totally more than 41% among all type of convective related events and those their damages have dramatically rising trend in last several years.
- ❑ 1996, 2002, 2007, 2014 and 2015 were drought and dry years, therefore, fire occurred much more than that in other years.
- ❑ In drought and dzud years of 2000, 2001 and 2010, as a percentage of GDP, the total damage caused by atmospheric extreme events were comparatively higher.
- ❑ During the recent 10 years, the number of victims have been decreased by 2.5 times.
- ❑ The risks of extreme events, such as flash floods, strong wind storms have been increased, and lead a significant negative impact on the social economy. Therefore, the government urgently needs to create weather radar network over the country.



***THANK YOU***