



Central Asia Regional Flash Flood Guidance System: “Hands-On” Exercise

Theresa M. Modrick, PhD
TModrick@hrcwater.org
Hydrologic Research Center

CARFFG SCM2

04-06 OCT 2016

Astana, KAZAKHSTAN

Example “Daily Operation”

Use of FFG System is extension of responsibilities of operational forecasters.

- Daily Weather Briefing
 - Example by Kazhydromet
- Hydrologic Output
- FFG Product Analysis
- Flash Flood Threat
- Discussion

Example Event: 09 May 2016

CARFFG - Central Asia Regional Flash Flood Guidance System

The CARFFG System is presently being prepared for on-site deployment. During this preparation, the interface and displayed data contents availability may be occasionally interrupted.

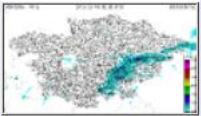
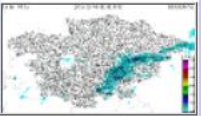
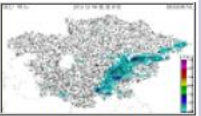



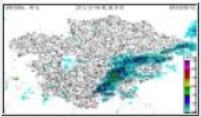
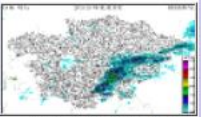
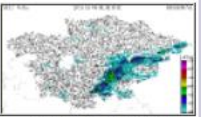
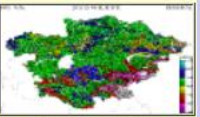


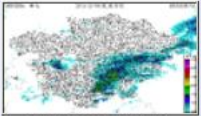
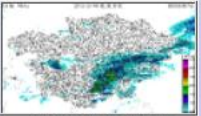
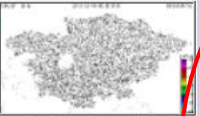
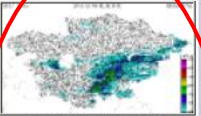
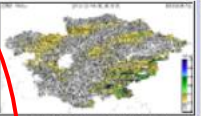



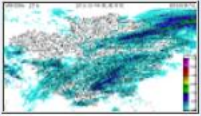
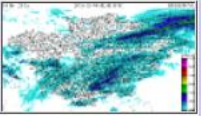
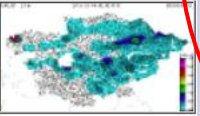
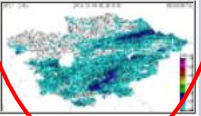
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Nav Date: 2016-05-09 00:00 UTC

Year: 2016 Month: 05 Day: 09 Hour: 00 REGION: REGIONAL

-1 Month -1 Day -6 Hours -1 Hour +1 Hour +6 Hours +1 Day +1 Month

Prev 6-hr Interval (18 UTC) Reset to Current Next 6-hr Interval (06 UTC)

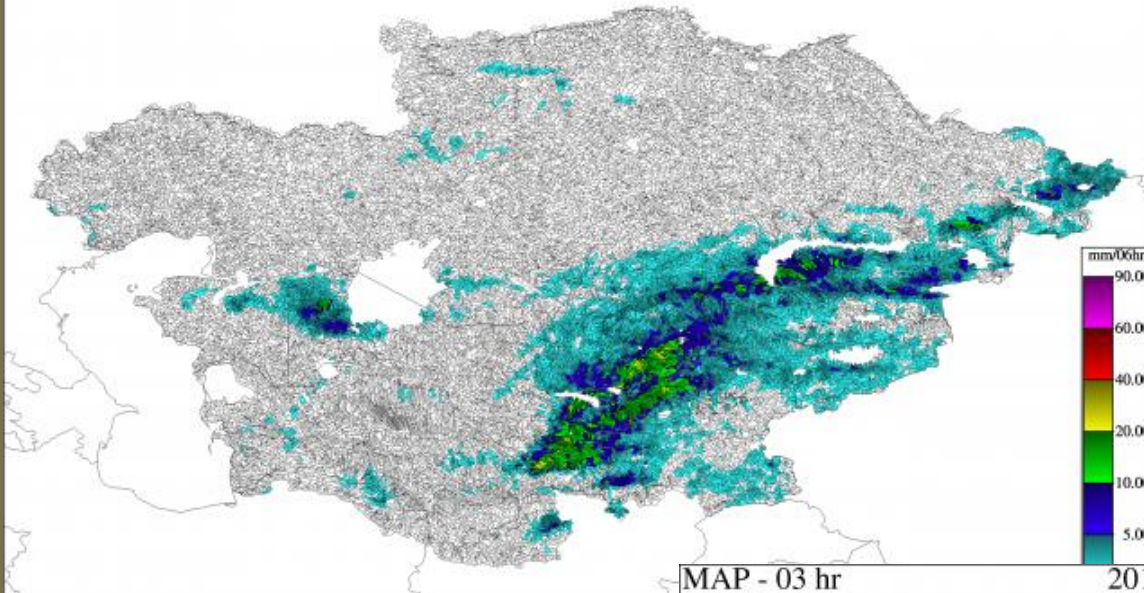
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03-hr	 2016-05-09 00:00 UTC Text: view	 2016-05-09 00:00 UTC Text: view		 2016-05-09 00:00 UTC Text: view		 2016-05-09 00:00 UTC Text: view	 2016-05-08 21:00 UTC Text: view	 2016-05-09 00:00 UTC Text: view
06-hr	 2016-05-09 00:00 UTC Text: view	 2016-05-09 00:00 UTC Text: view	 2016-05-09 00:00 UTC Text: view	 2016-05-09 00:00 UTC Text: view	 2016-05-09 00:00 UTC Text: view	 2016-05-09 00:00 UTC Text: view	 2016-05-09 00:00 UTC Text: view	 2016-05-09 00:00 UTC Text: view
24-hr	 2016-05-09 00:00 UTC Text: view	 2016-05-09 00:00 UTC Text: view	 2016-05-09 00:00 UTC Text: view	 2016-05-09 00:00 UTC Text: view				

09 May 2016 00UTC

MAP - 06 hr

2016-05-09 00:00 UTC

REGIONAL



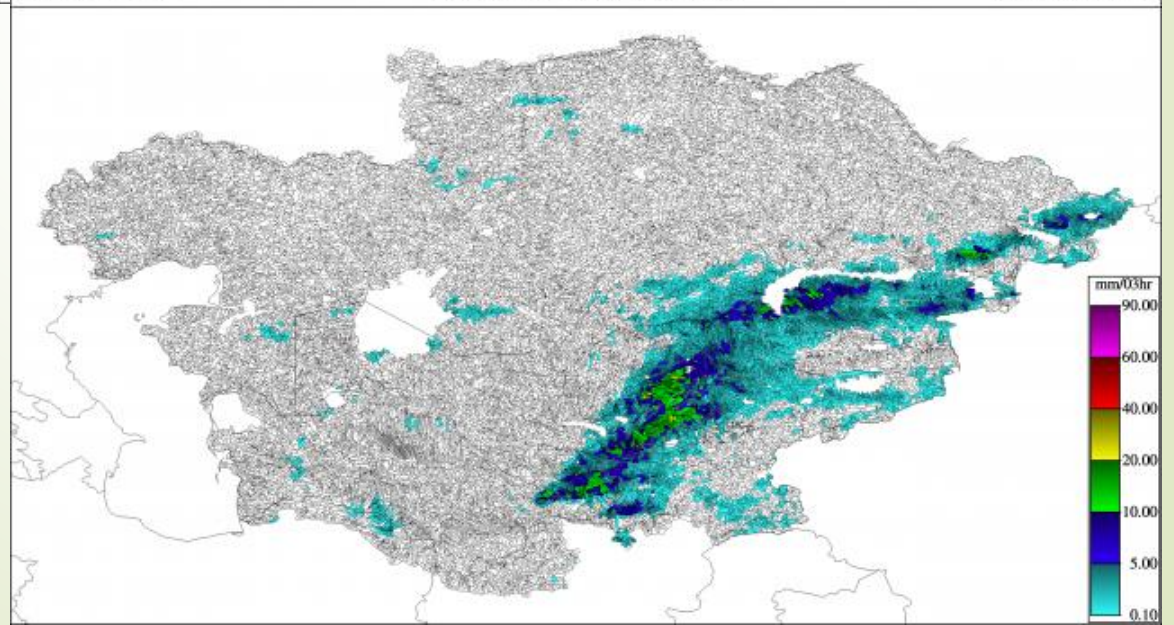
MERGED MAP

Rainfall rate of 10-20 mm/6hr in green; some between 20-40 mm/6hr in yellow.

MAP - 03 hr

2016-05-09 00:00 UTC

REGIONAL



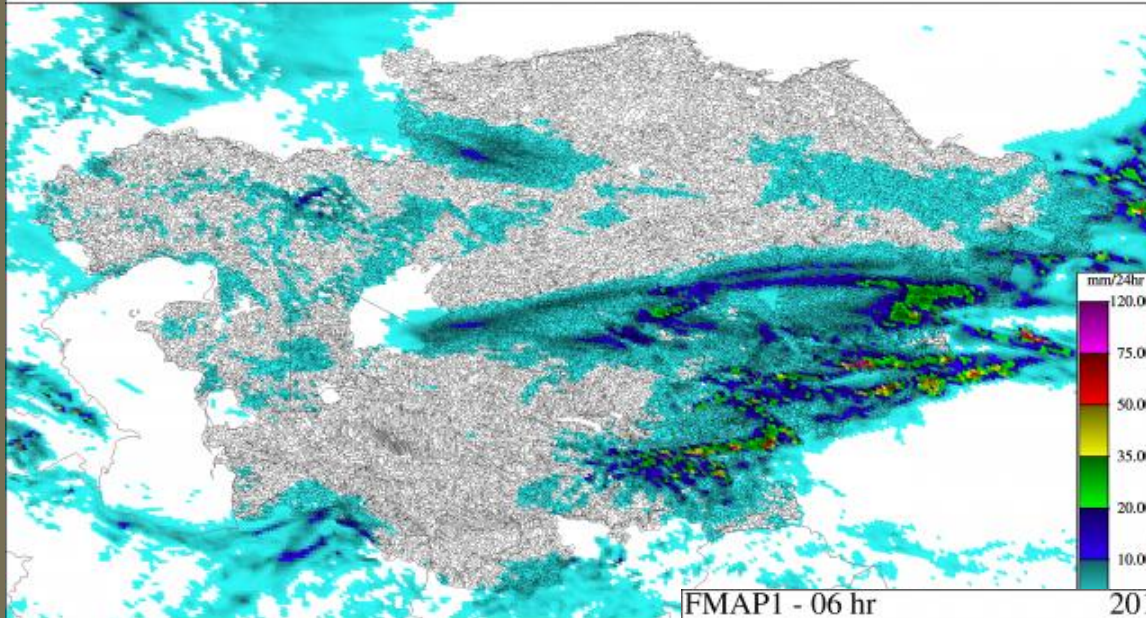
For recent 3 hours,
rates between 10-20 mm
in green.

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FORECAST1 - 24 hr

2016-05-09 00:00 UTC

REGIONAL



FORECAST PRECIPITATION

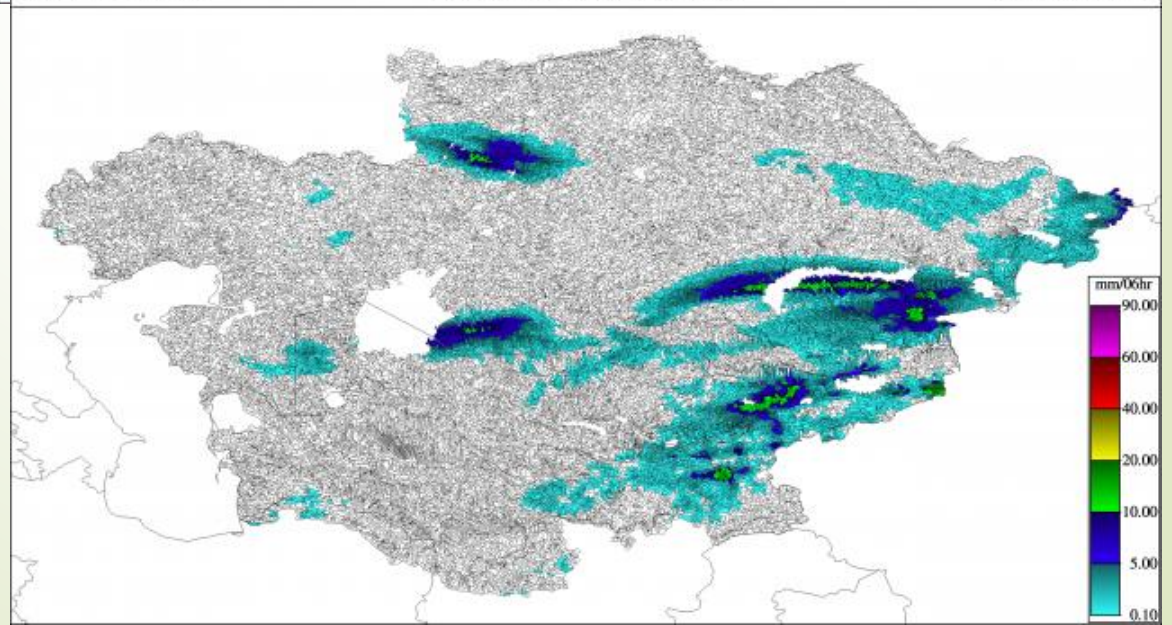
Gridded output shows totals exceeding 50 mm/day for next 24 hours. Some areas exceed 75 mm/day.

IS THIS RATE OF CONCERN IN THIS REGION?

FMAP1 - 06 hr

2016-05-09 00:00 UTC

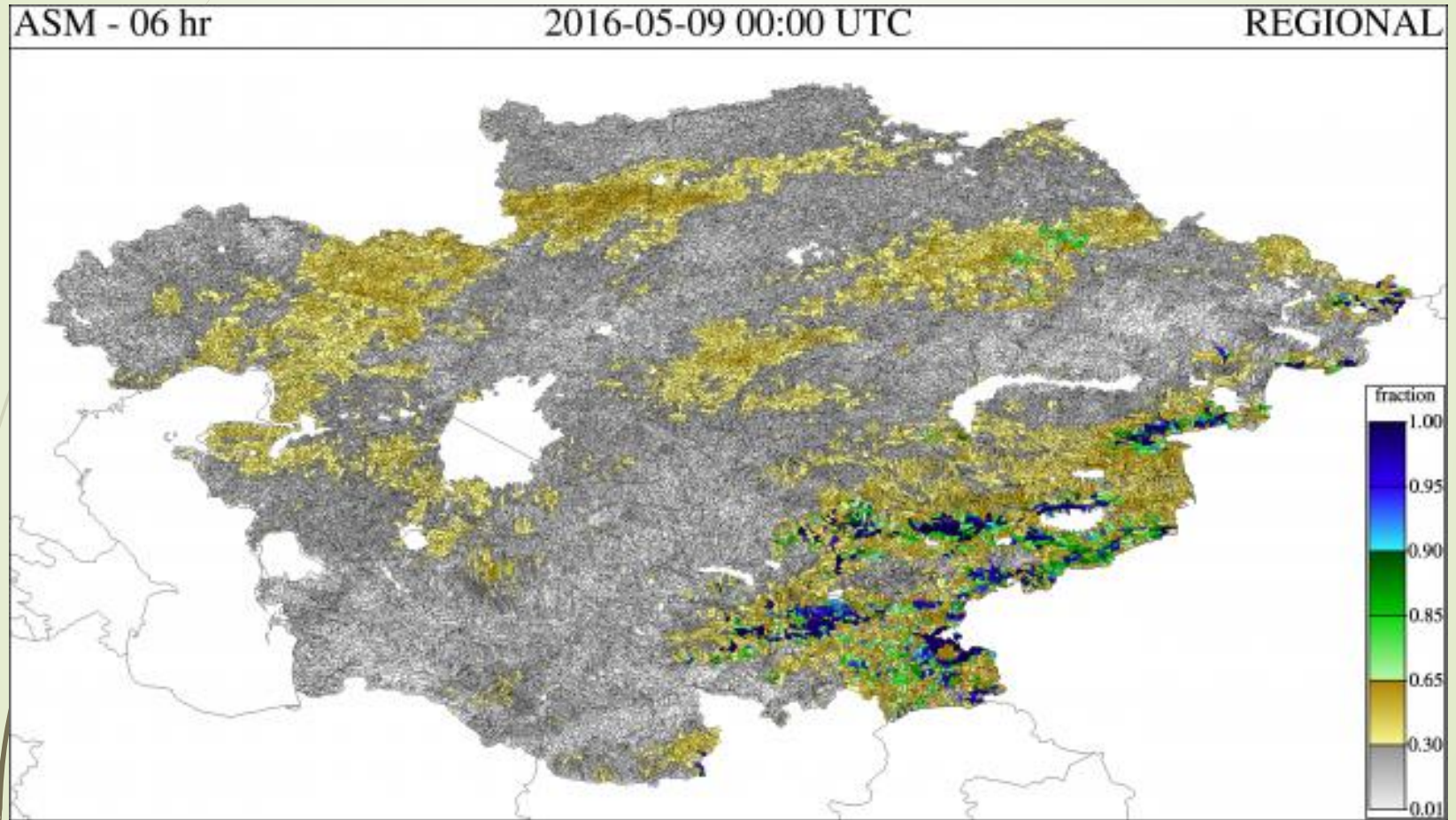
REGIONAL



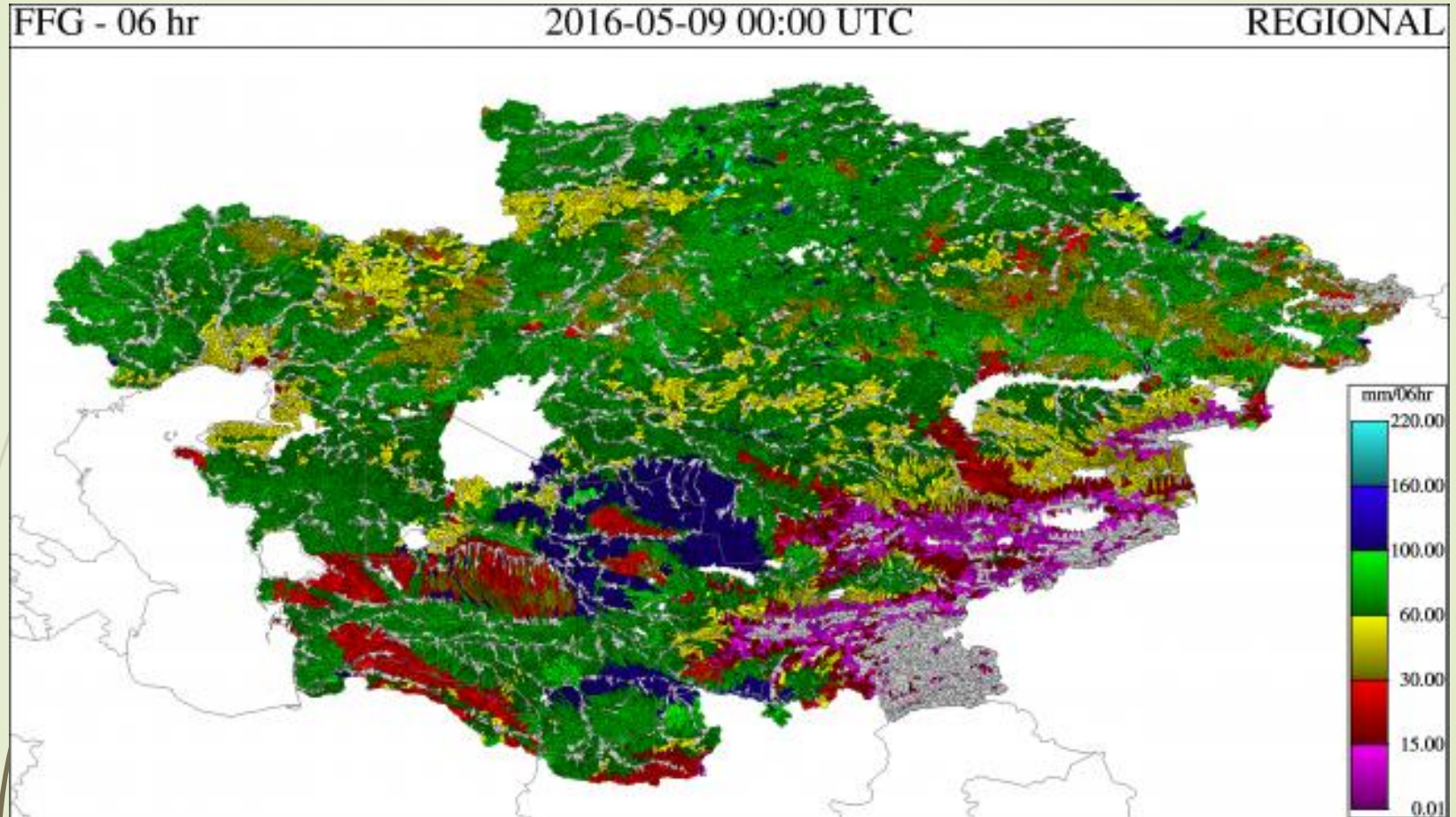
For next 6 hour, forecast MAP shows maximum of 10-20mm/6hr.

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ASM product shows state of soil saturation in upper layer.



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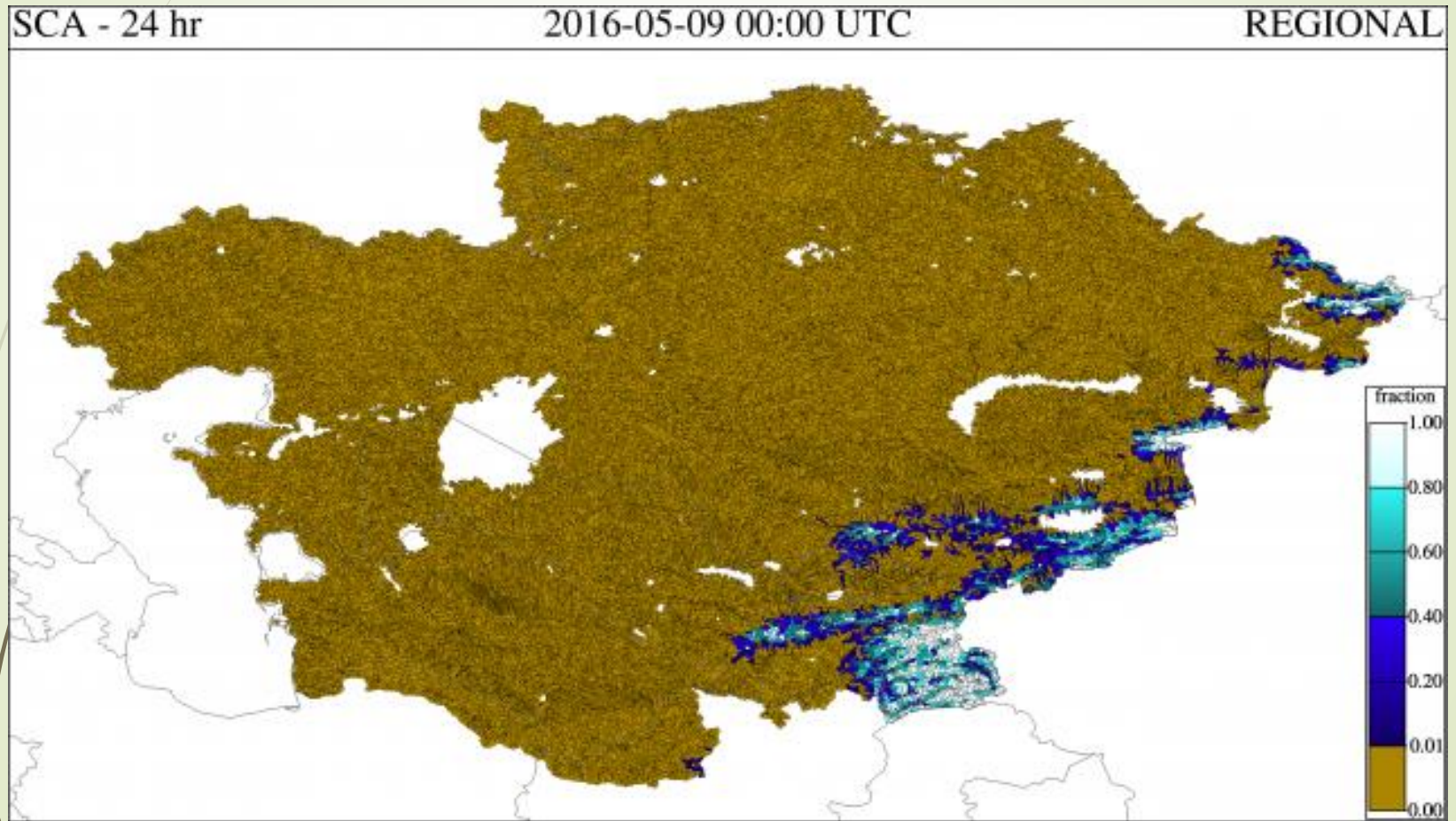


WHY ARE BASINS IN GRAY IN SOME REGIONS?

This are identified as snow covered, and FFG is not computed.

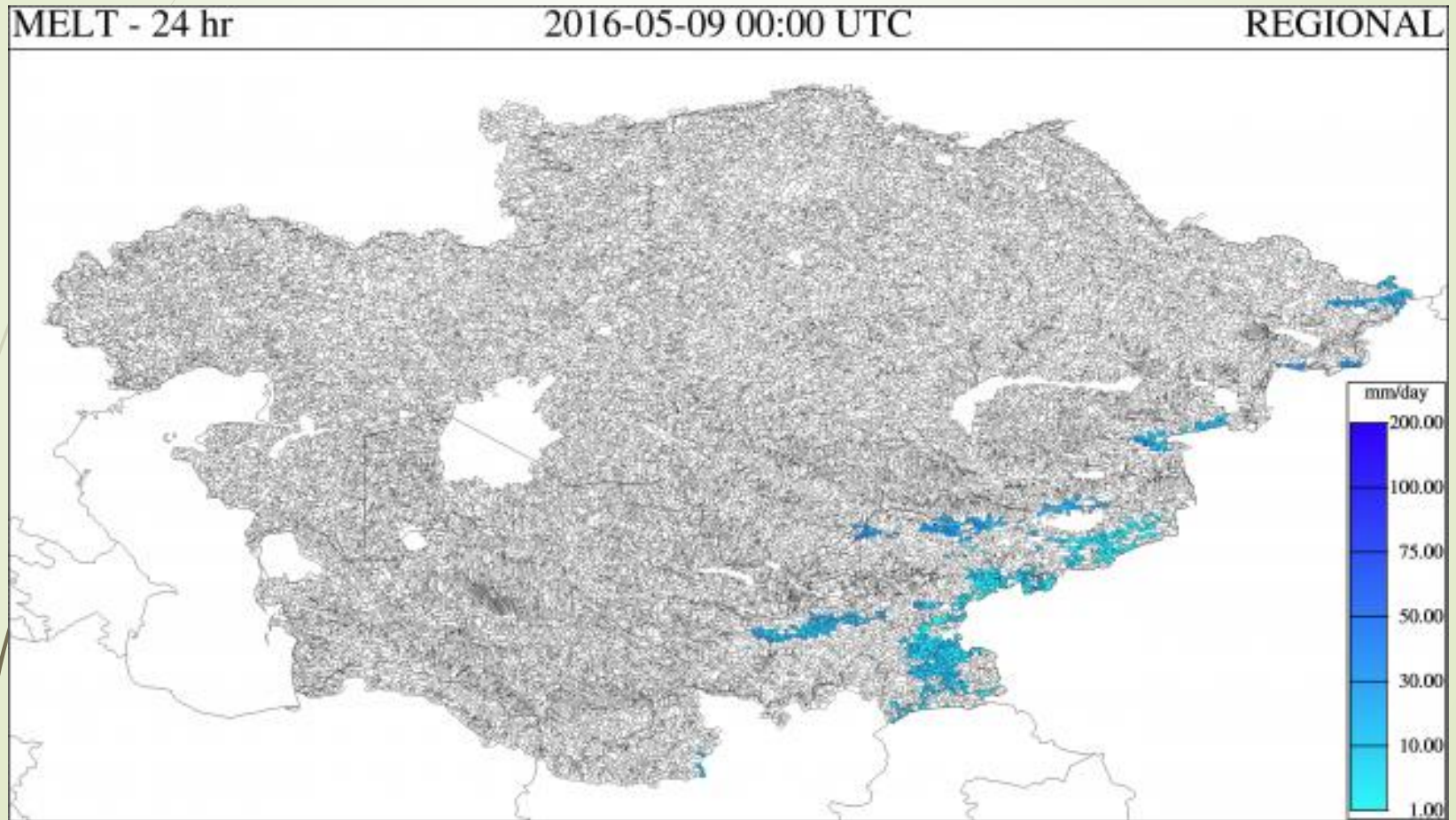
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Satellite-based snow covered area (as fraction of the basin area)



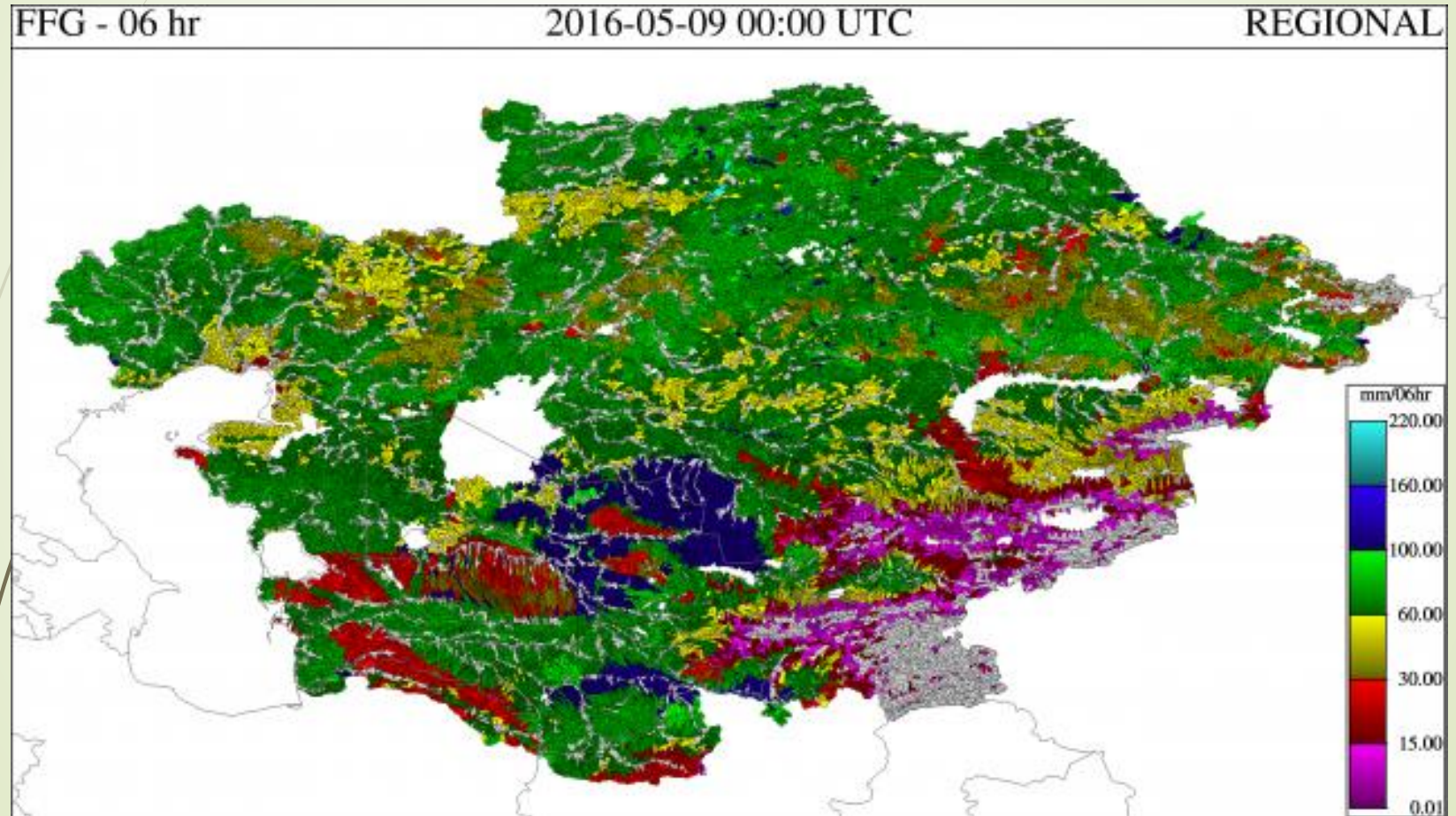
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Snow accumulation and ablation is calculated by the snow model component.
Snow melt is determined and contributes to the soil saturation.



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FFG in magenta indicates < 15 mm/6hr required to produce bankfull flows;
in red indicates < 30 mm/6hr.

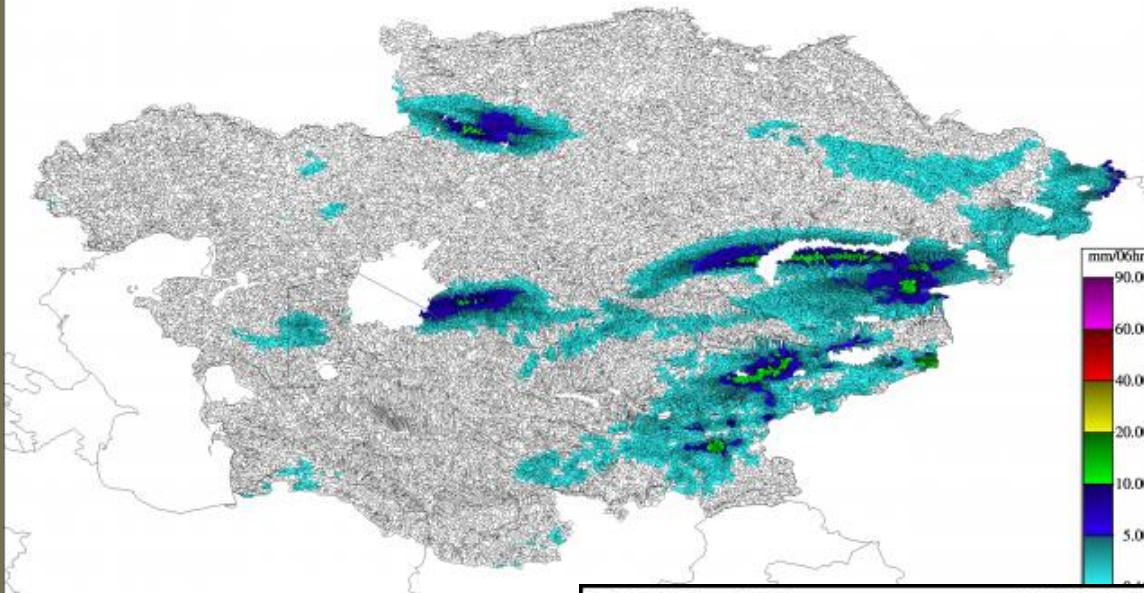


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FMAPI - 06 hr

2016-05-09 00:00 UTC

REGIONAL



Forecast MAP shows 10-20 mm/6hr.

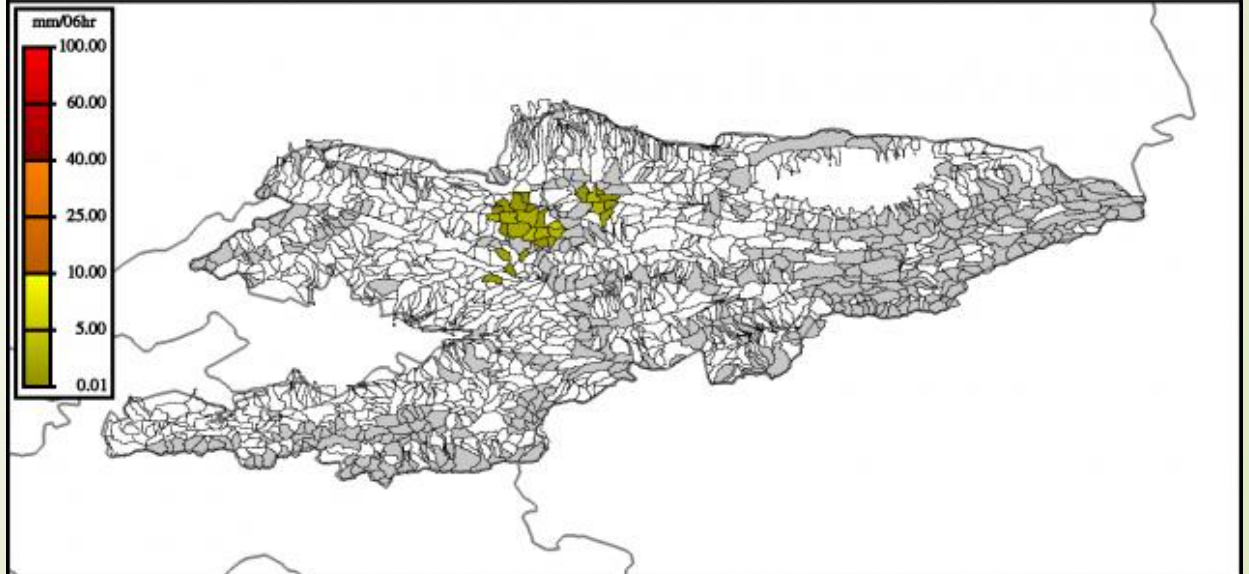
IS THIS FORECAST FOR THE BASINS WITH LOW FFFG?

WHICH SYSTEM PRODUCT MAKES THAT COMPARISON?

FFFT1 - 06 hr

2016-05-09 00:00 UTC

KYRGYZSTAN



DISCUSS:
FORECASTER DECISION
*SHOULD I MAKE A
WARNING?*

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CARFFG - Central Asia Regional Flash Flood Guidance System

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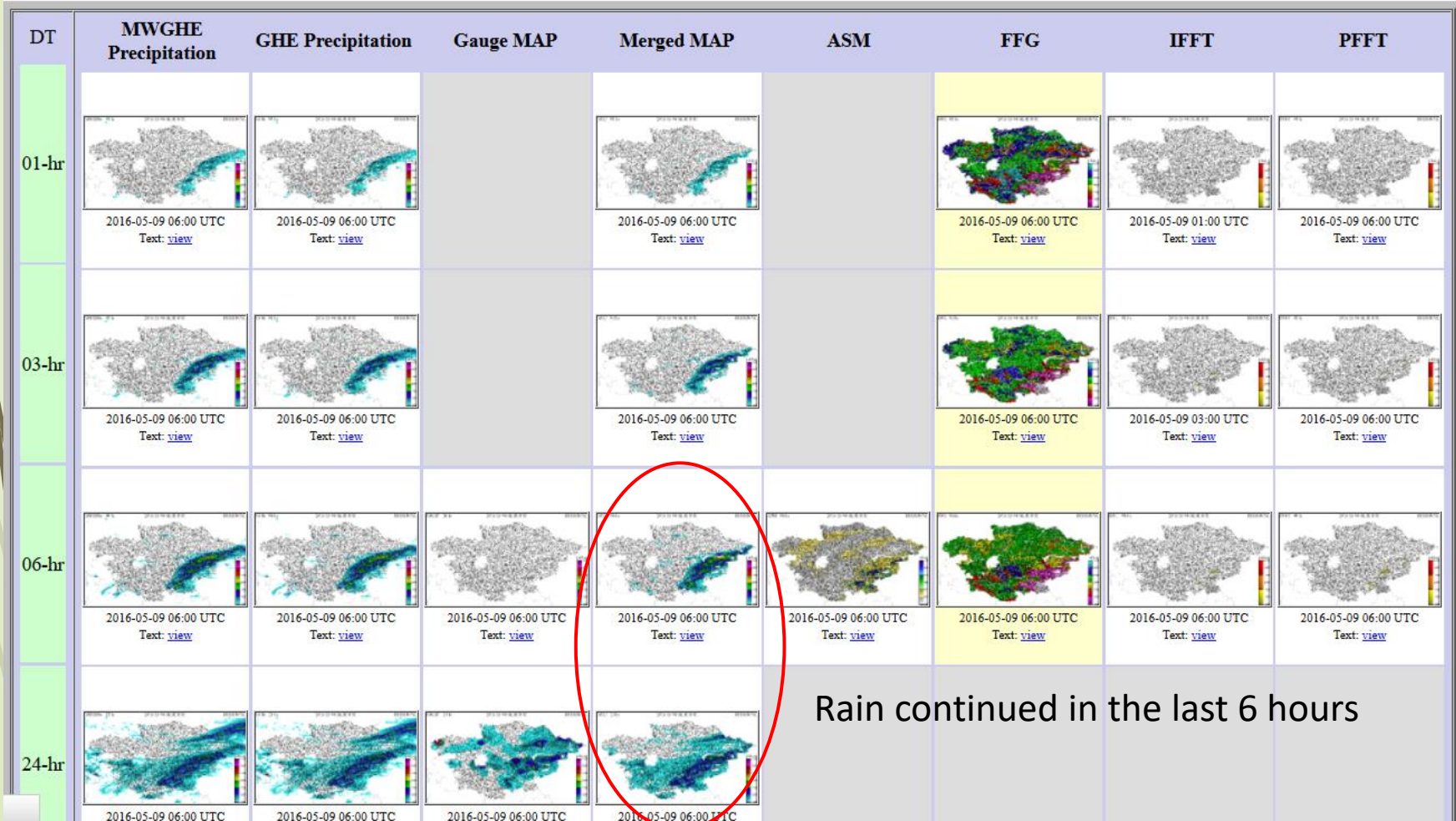
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Nav Date: 2016-05-09 06:00 UTC

Year: 2016 Month: 05 Day: 09 Hour: 06 REGION: REGIONAL Submit

-1 Month -1 Day -6 Hours -1 Hour +1 Hour +6 Hours +1 Day +1 Month

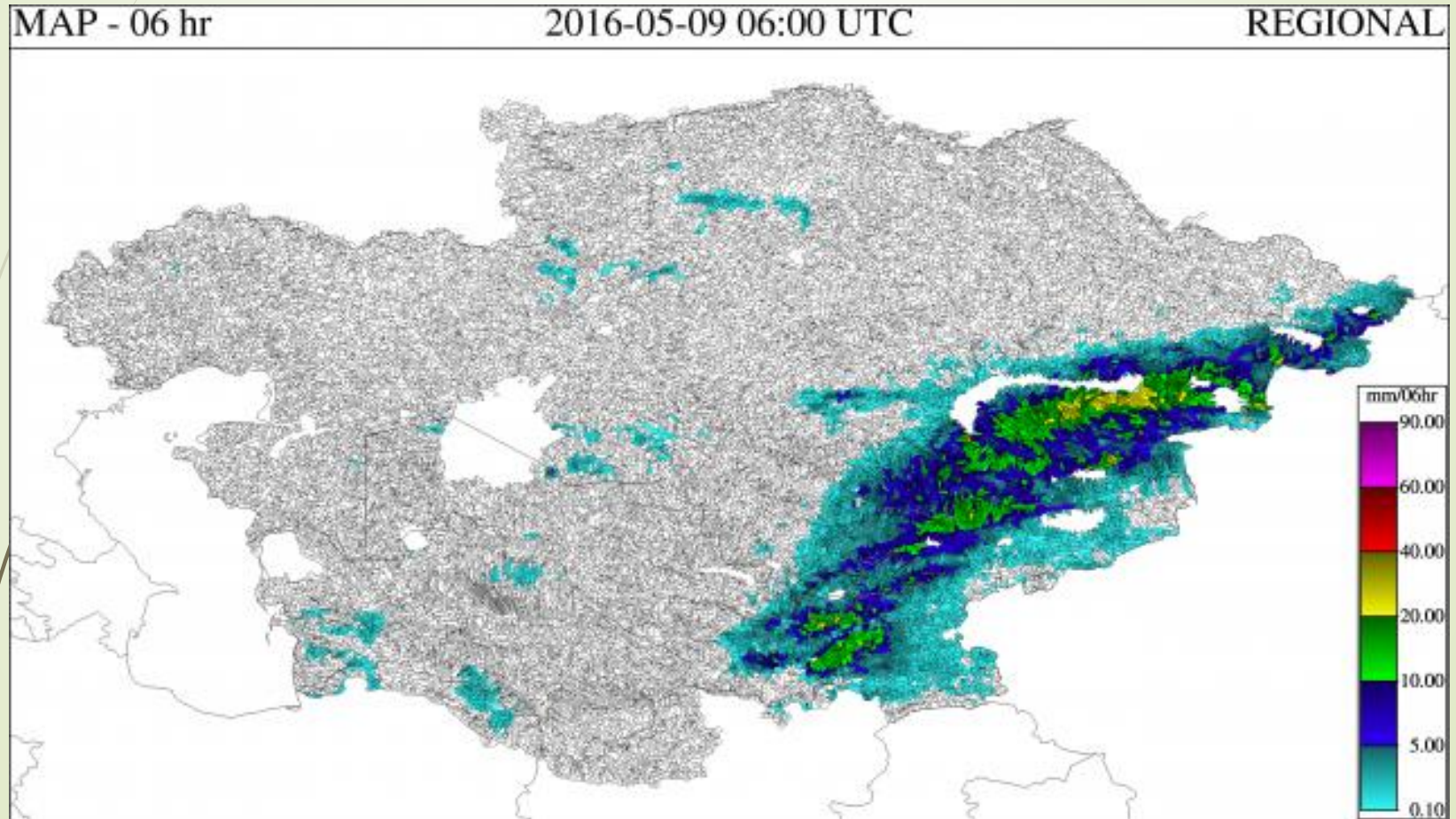
Prev 6-hr Interval (00 UTC) Reset to Current Next 6-hr Interval (12 UTC)



Rain continued in the last 6 hours

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During this 6-hour period (00-06 UTC), rainfall rates were 10-20 mm/6hr shown in green; area in Kazakhstan shows 20-40 mm/6hr.



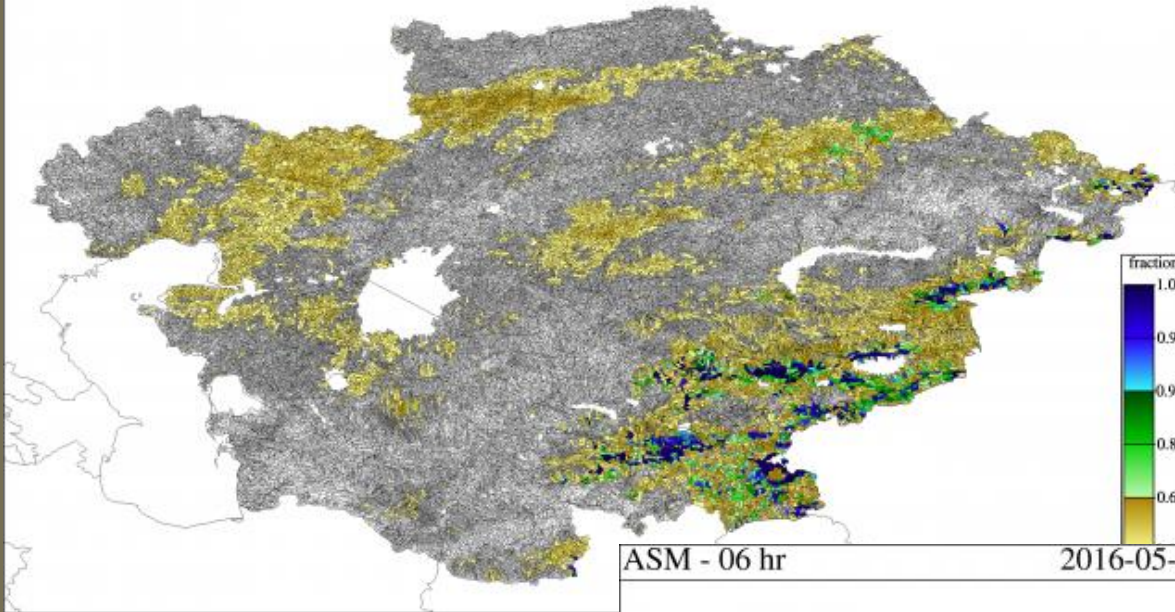
COMPARE OBSERVED RATE WITH PRIOR FORECAST OF PRECIPITATION

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ASM - 06 hr

2016-05-09 00:00 UTC

REGIONAL



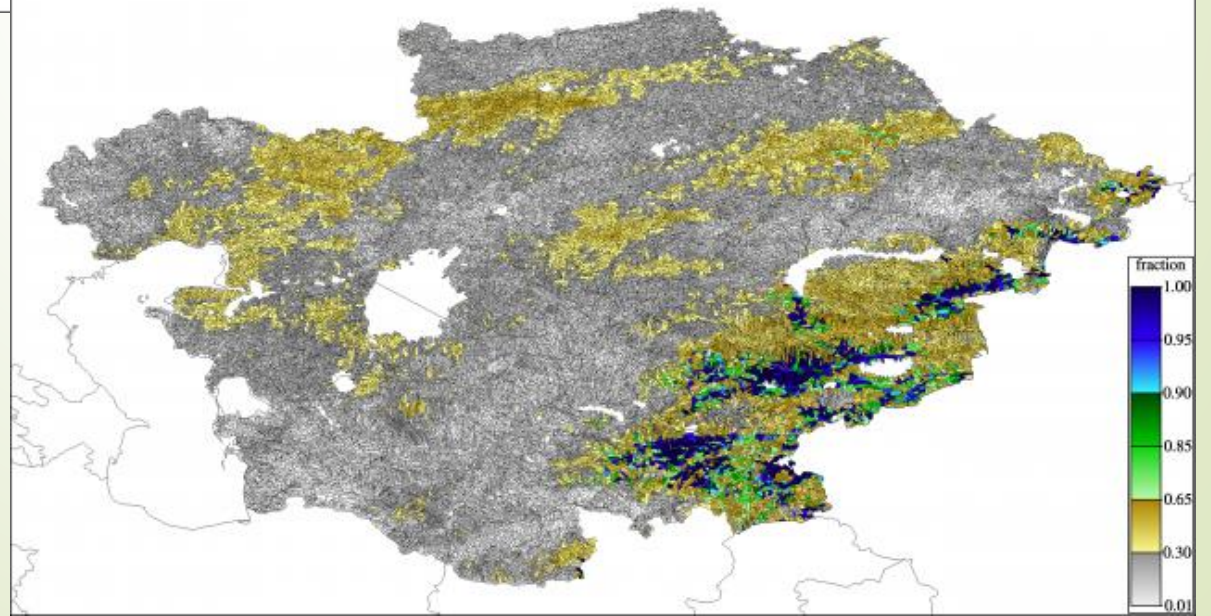
Examine changes in soil moisture during this 6 hour period.

HOW HAS SOIL MOISTURE CHANGED?

ASM - 06 hr

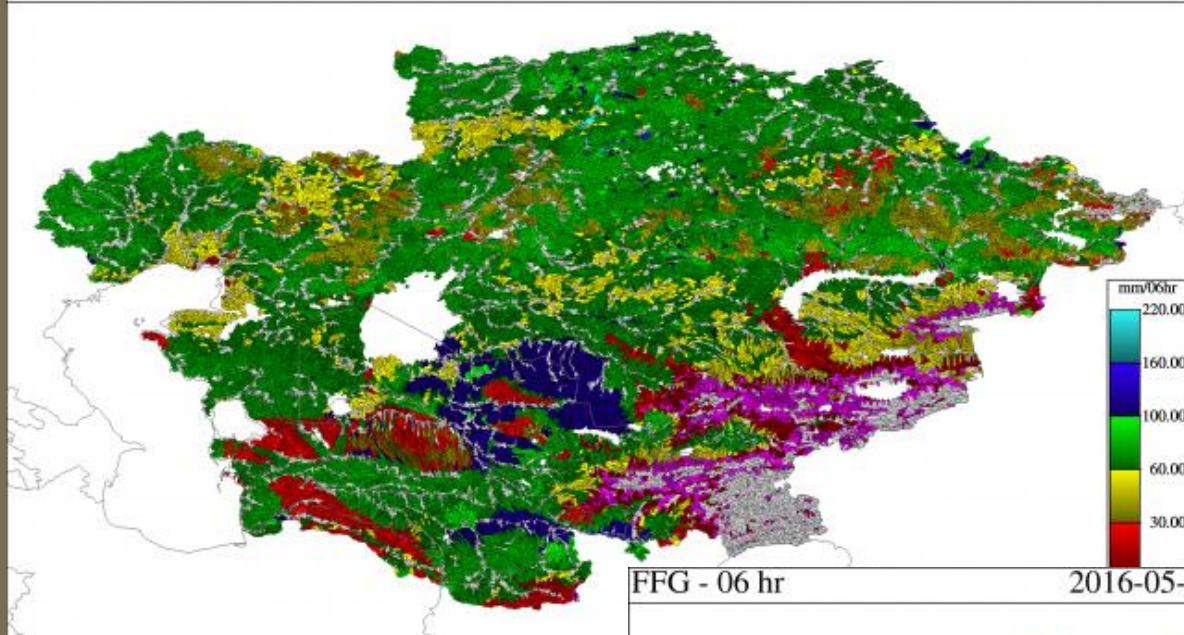
2016-05-09 06:00 UTC

REGIONAL



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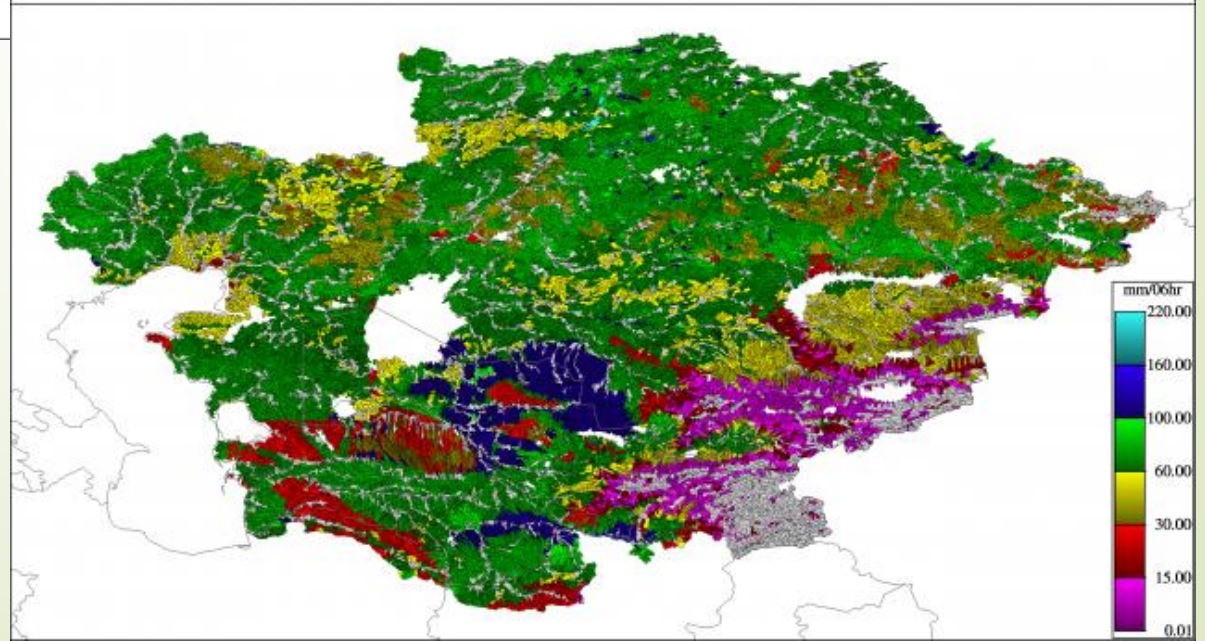
FFG - 06 hr 2016-05-09 00:00 UTC REGIONAL



Examine changes in FFG during this 6 hour period.

FFG change is typically more gradual. There are more “magenta” basins. FFG is lower.

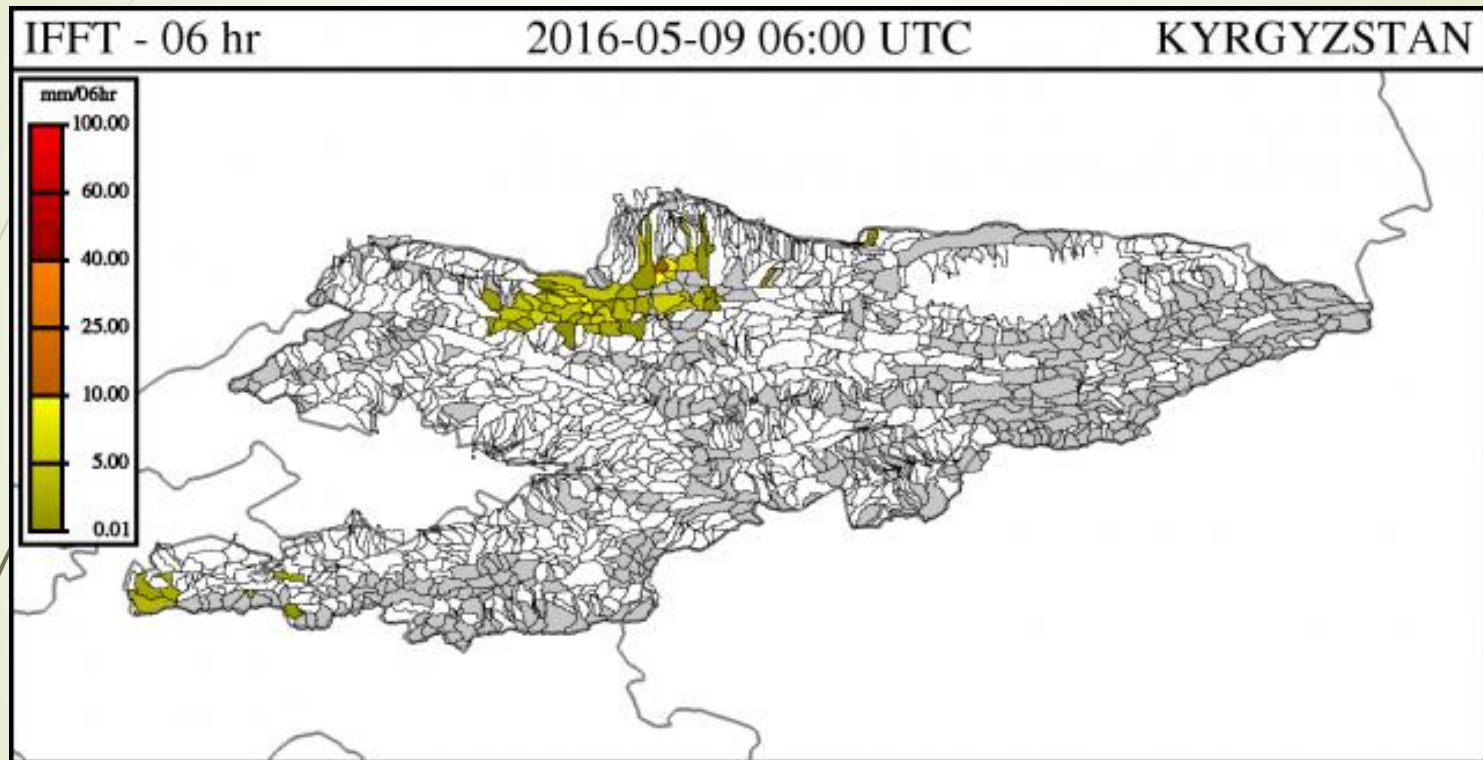
FFG - 06 hr 2016-05-09 06:00 UTC REGIONAL



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WHAT WOULD YOU LOOK AT NEXT?

Gulmira suggested IFFT/PFFT.



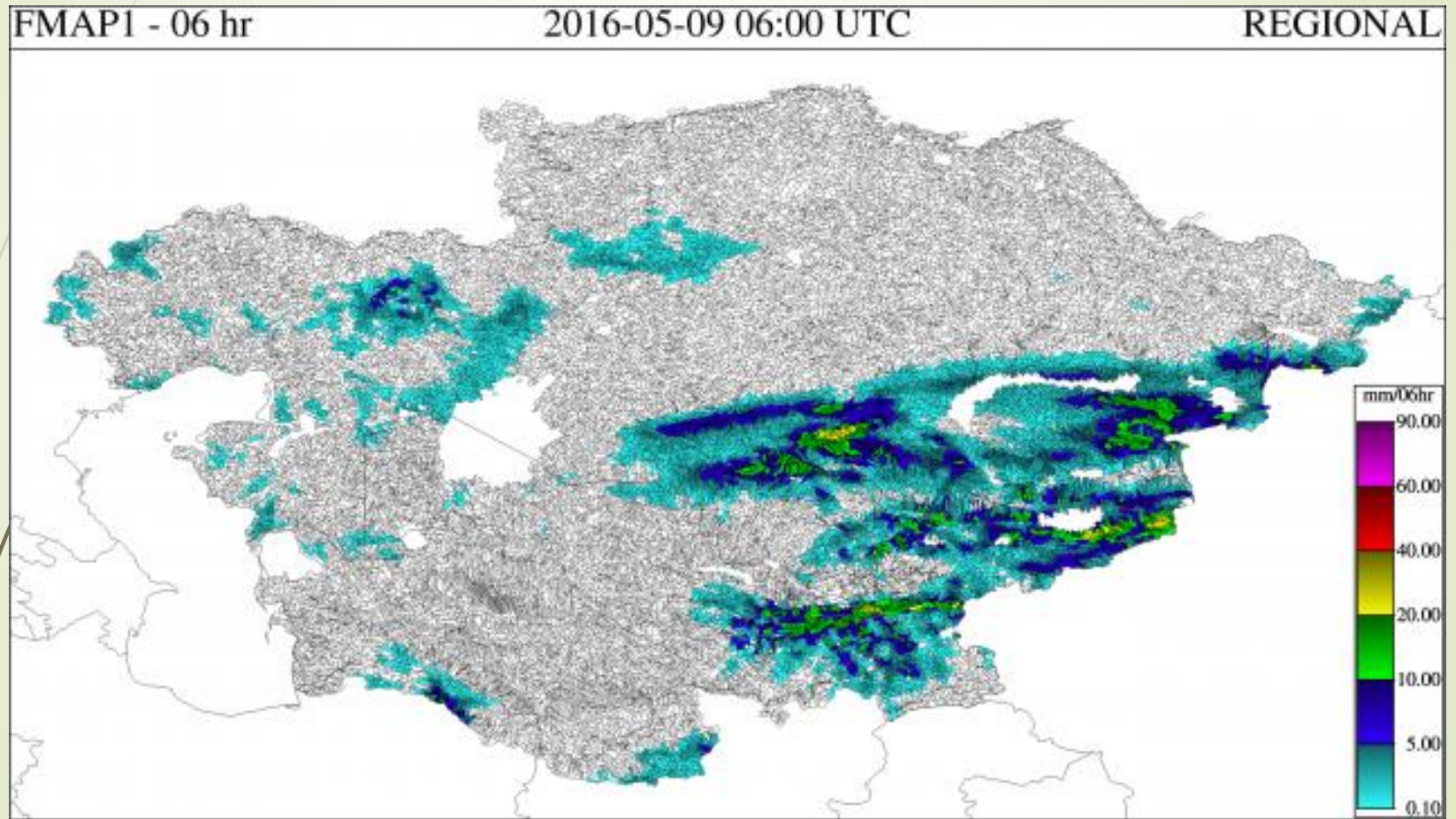
DISCUSS FORECASTER DECISION

WHAT WAYS TO VERIFY CONDITIONS

We also had discussion on conditions in Tajikistan and Uzbekistan.
WE STOPPED HERE DUE TO TIME. BUT I HAD MORE TO SHOW

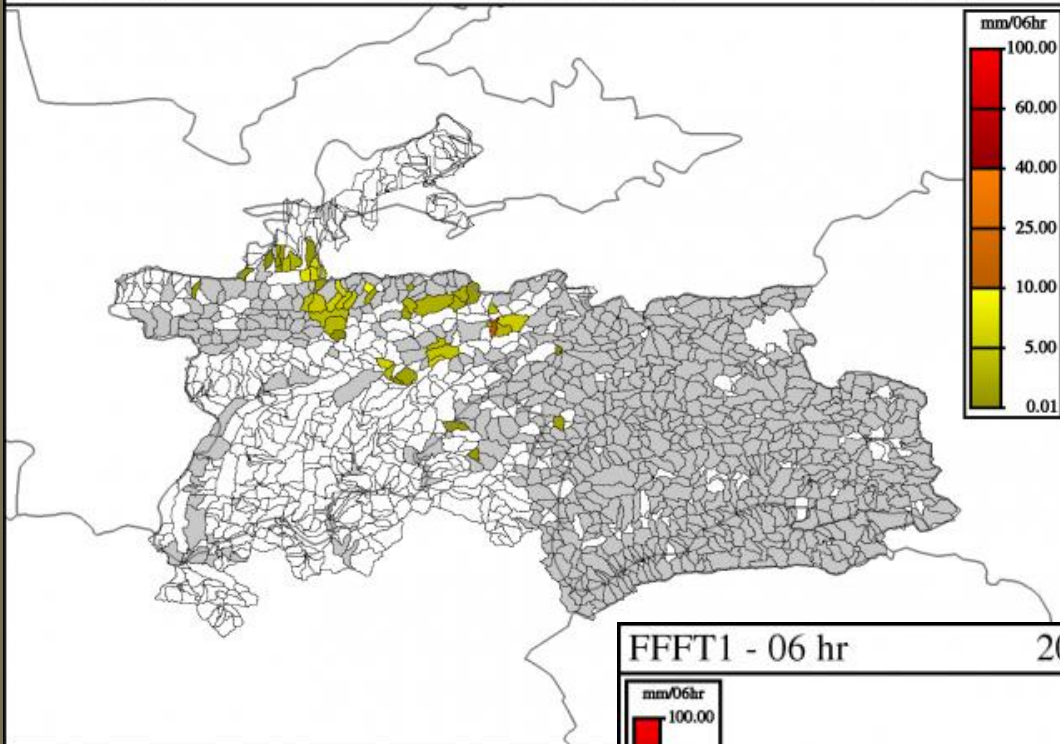
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Forecast MAP for next 6 hours shows continued 'heavy' rainfall up to 20-30 mm.



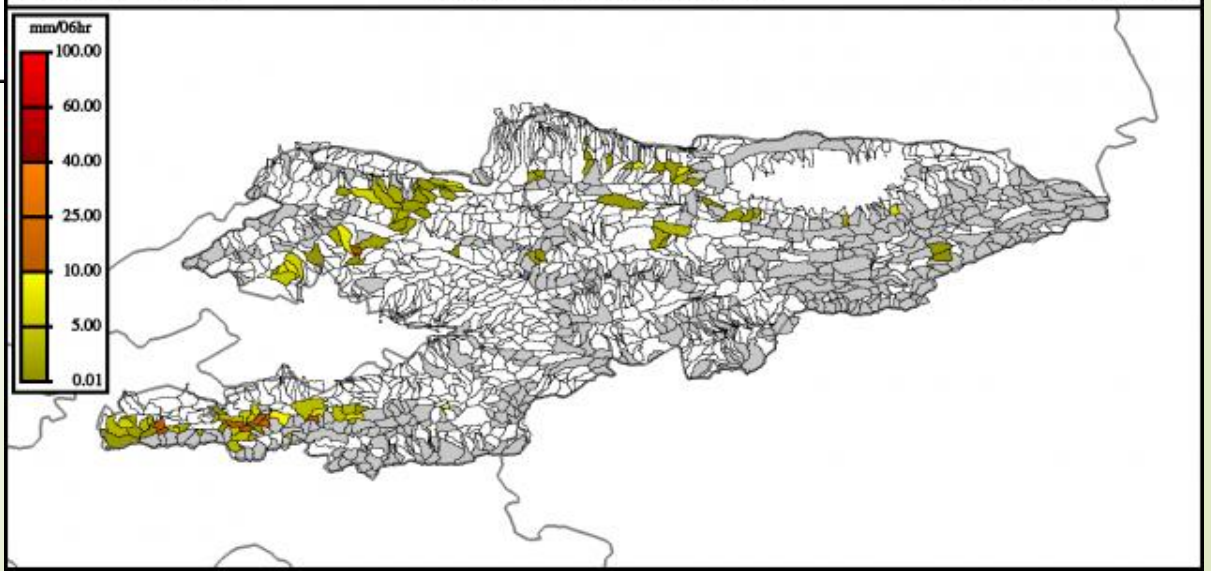
09 May 2016 06UTC

FFFT1 - 06 hr 2016-05-09 06:00 UTC TAJIKISTAN



FFFT: Forecast Flash Flood Threat
DISCUSS FORECASTER DECISION

FFFT1 - 06 hr 2016-05-09 06:00 UTC KYRGYZSTAN

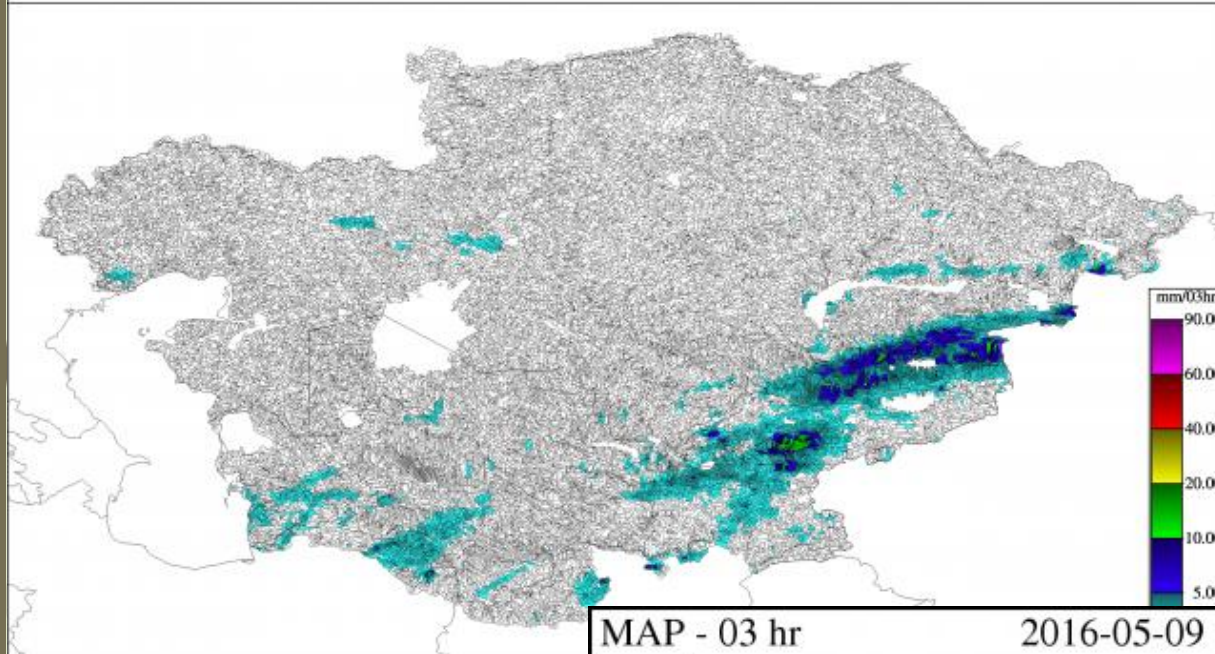


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MAP - 03 hr

2016-05-09 18:00 UTC

REGIONAL



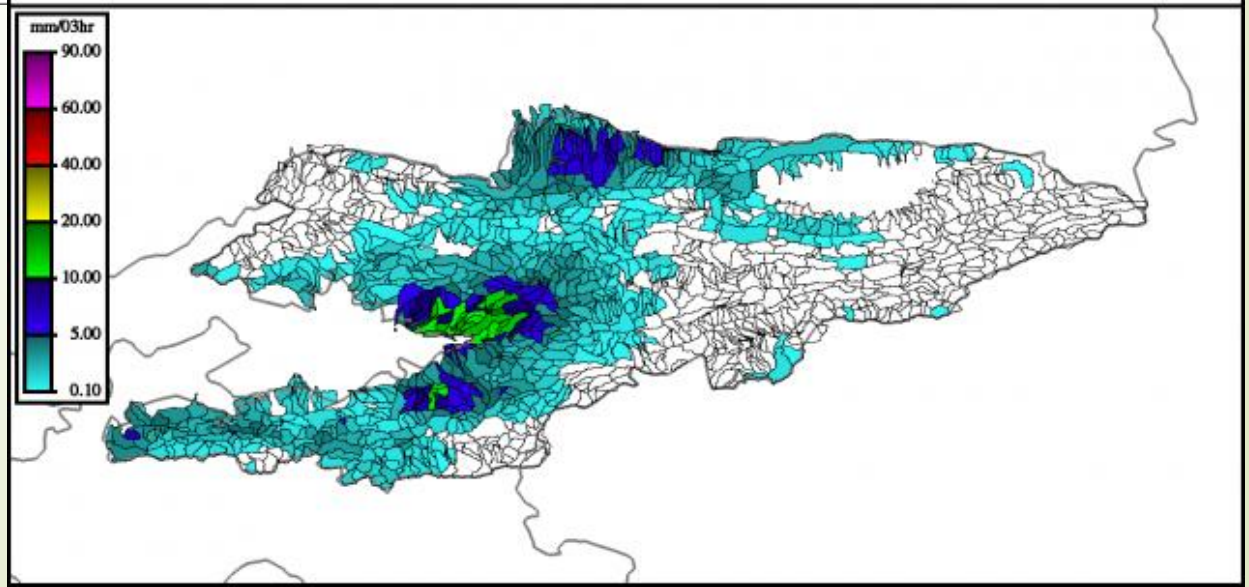
Rainfall decreased somewhat during 06-12 UTC. Look at 18 UTC (midnight local) for Kyrgyzstan.

There is a region of heavier precipitation (10-15 mm/3HR).

MAP - 03 hr

2016-05-09 18:00 UTC

KYRGYZSTAN

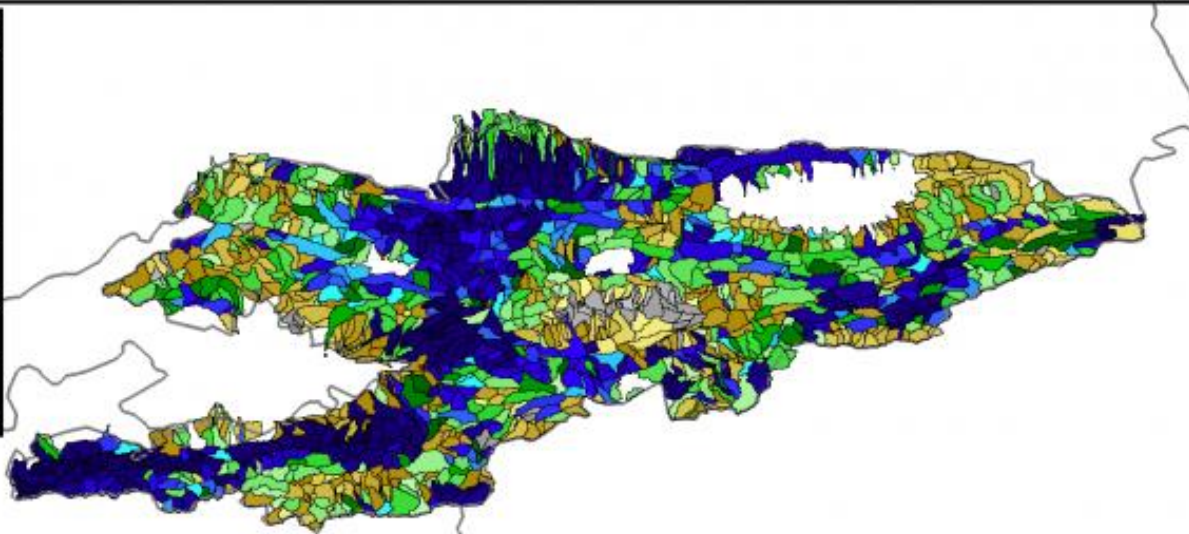
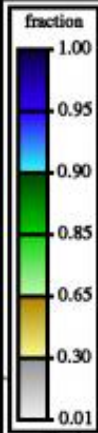


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ASM - 06 hr

2016-05-09 18:00 UTC

KYRGYZSTAN

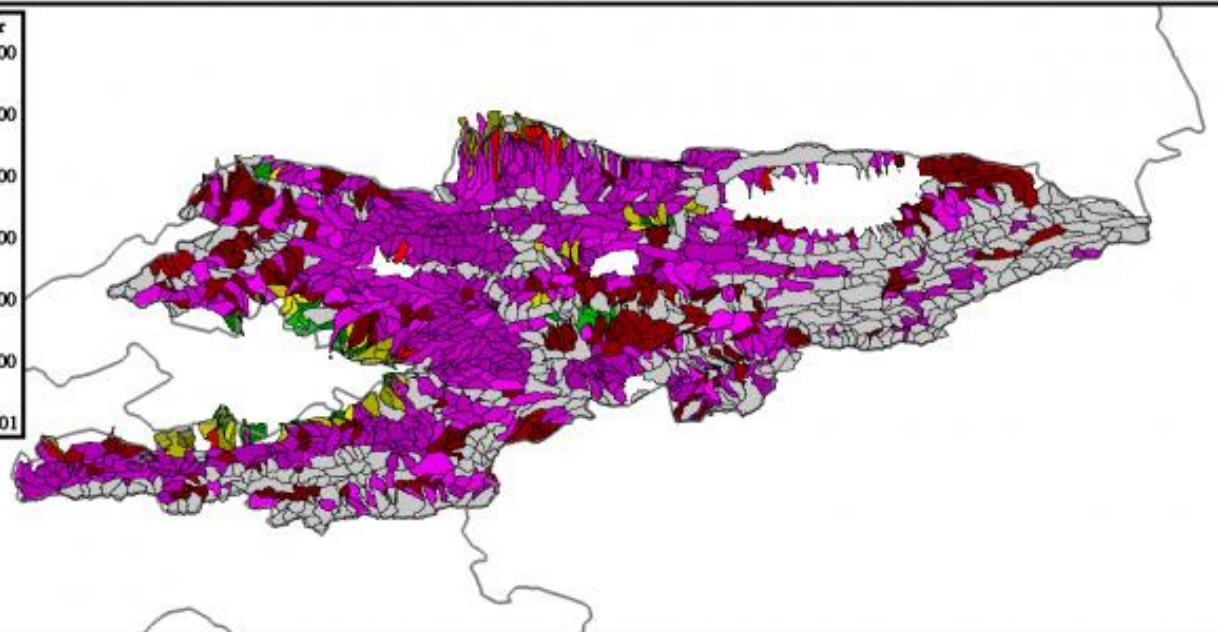
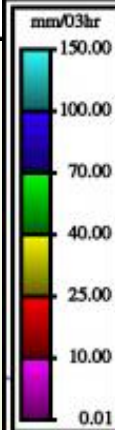


High soil saturation and low FFG values throughout.

FFG - 03 hr

2016-05-09 18:00 UTC

KYRGYZSTAN

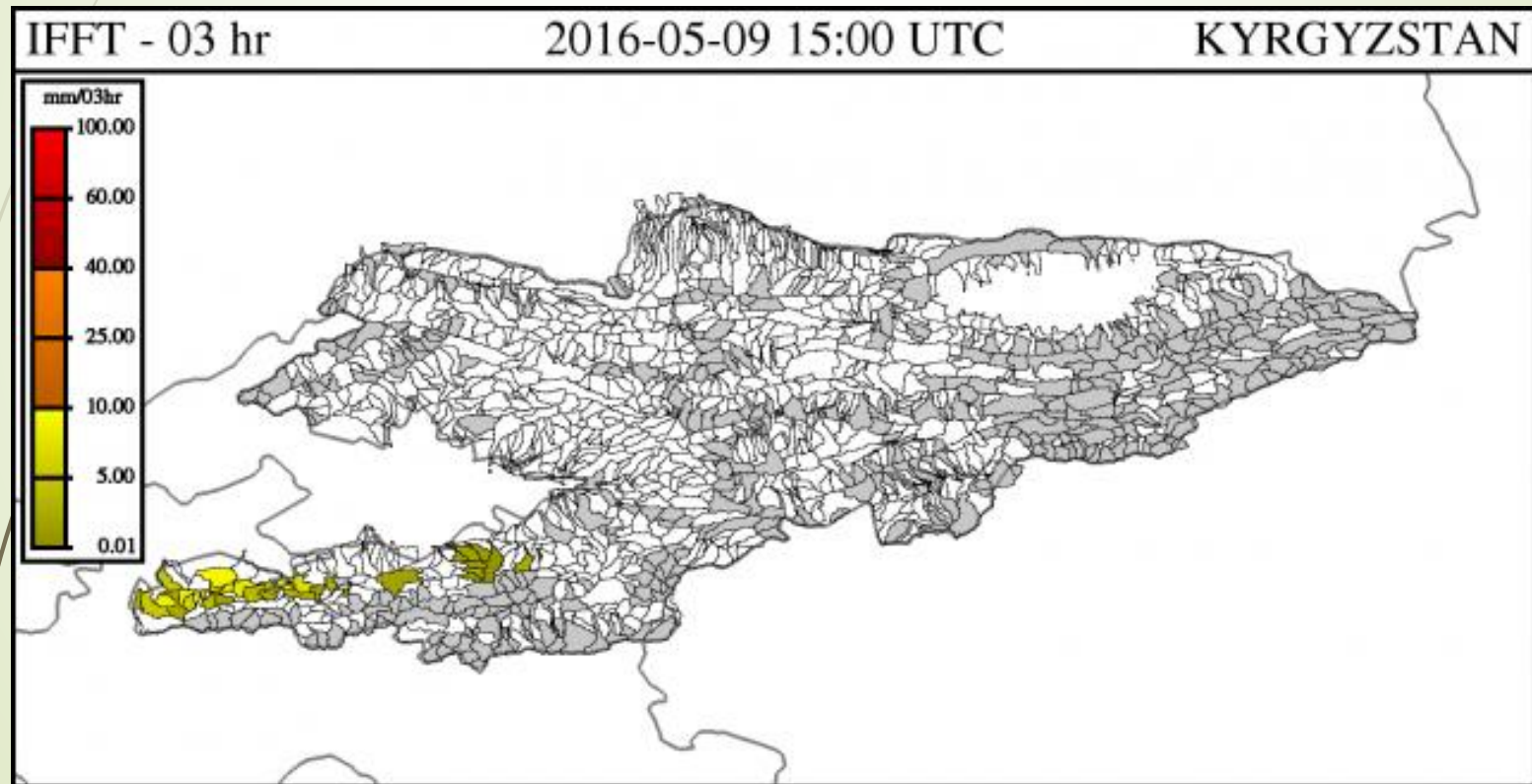


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Imminent Flash Flood Threat (IFFT) shows series of basins with positive IFFT.

WHAT DOES “IMMINENT” THREAT MEAN?

WHAT DOES THIS SAY ABOUT TIMING AND INTERACTION WITH EMERGENCY MANAGEMENT COLLEAGUES?



ANOTHER EXAMPLE: 02 Oct 2016 00UTC

CARFFG - Central Asia Regional Flash Flood Guidance System

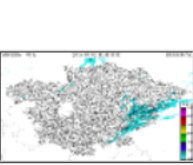
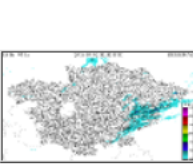
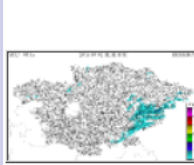
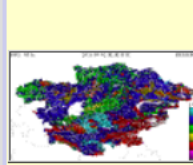
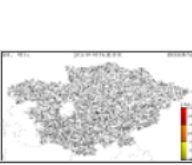
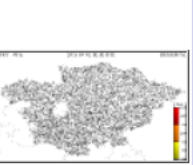
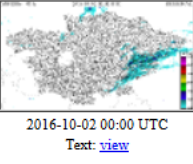
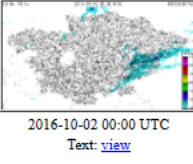
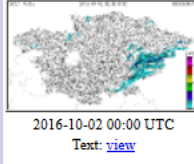
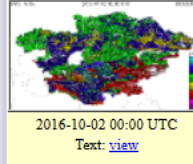

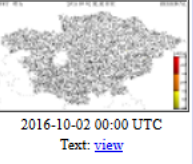
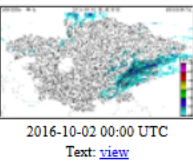
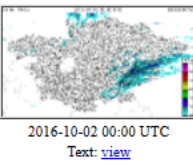
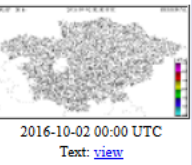
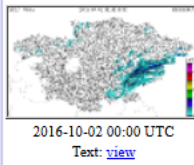
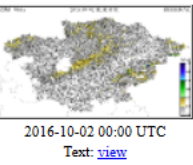
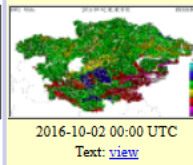
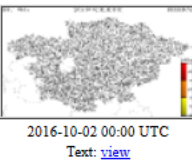
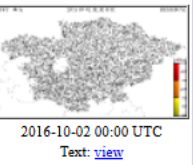




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Current Date: 2016-10-05 04:23 UTC

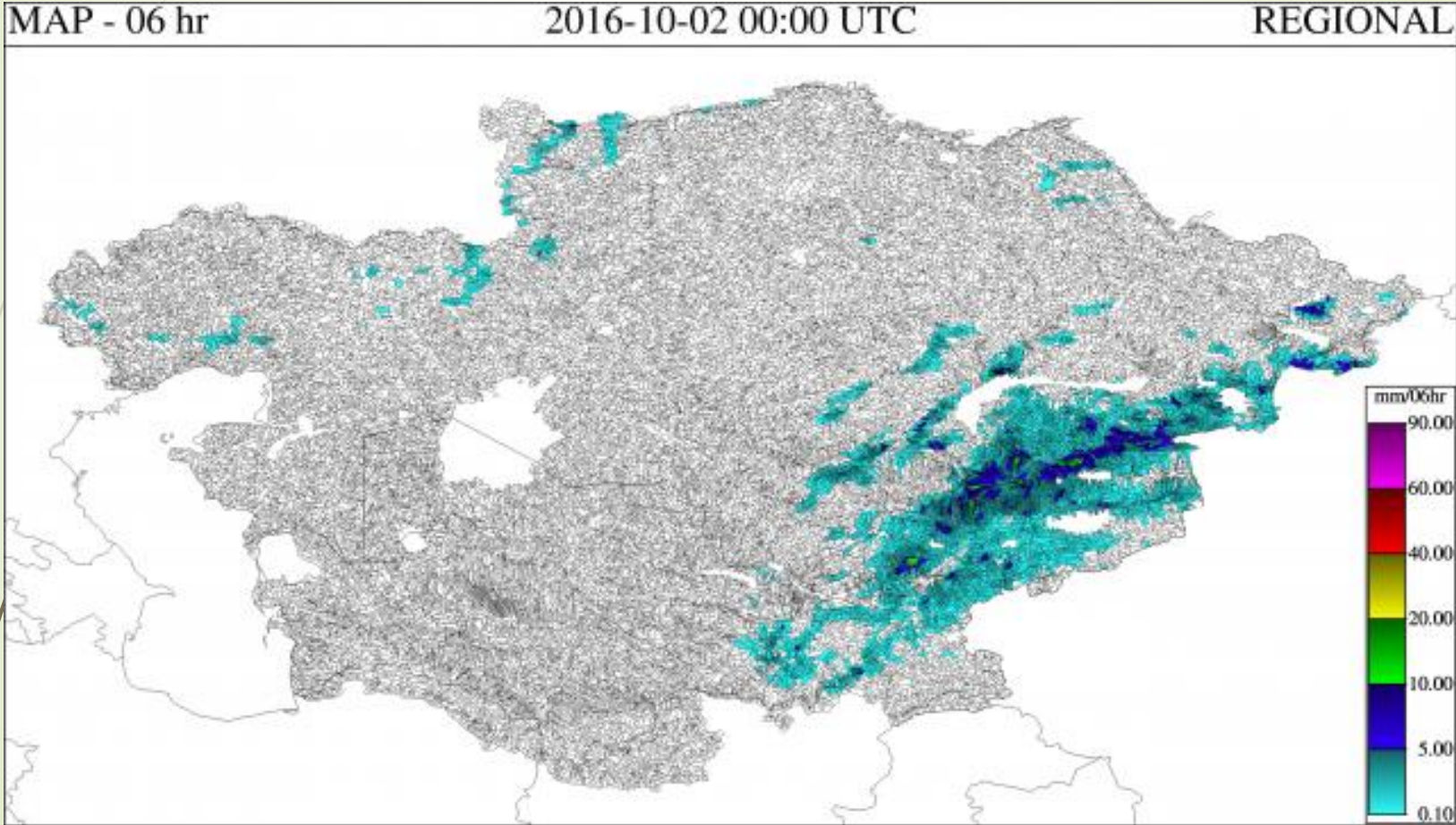
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Year: 2016 Month: 10 Day: 02 Hour: 00 REGION: REGIONAL

-1 Month -1 Day -6 Hours -1 Hour +1 Hour +6 Hours +1 Day +1 Month

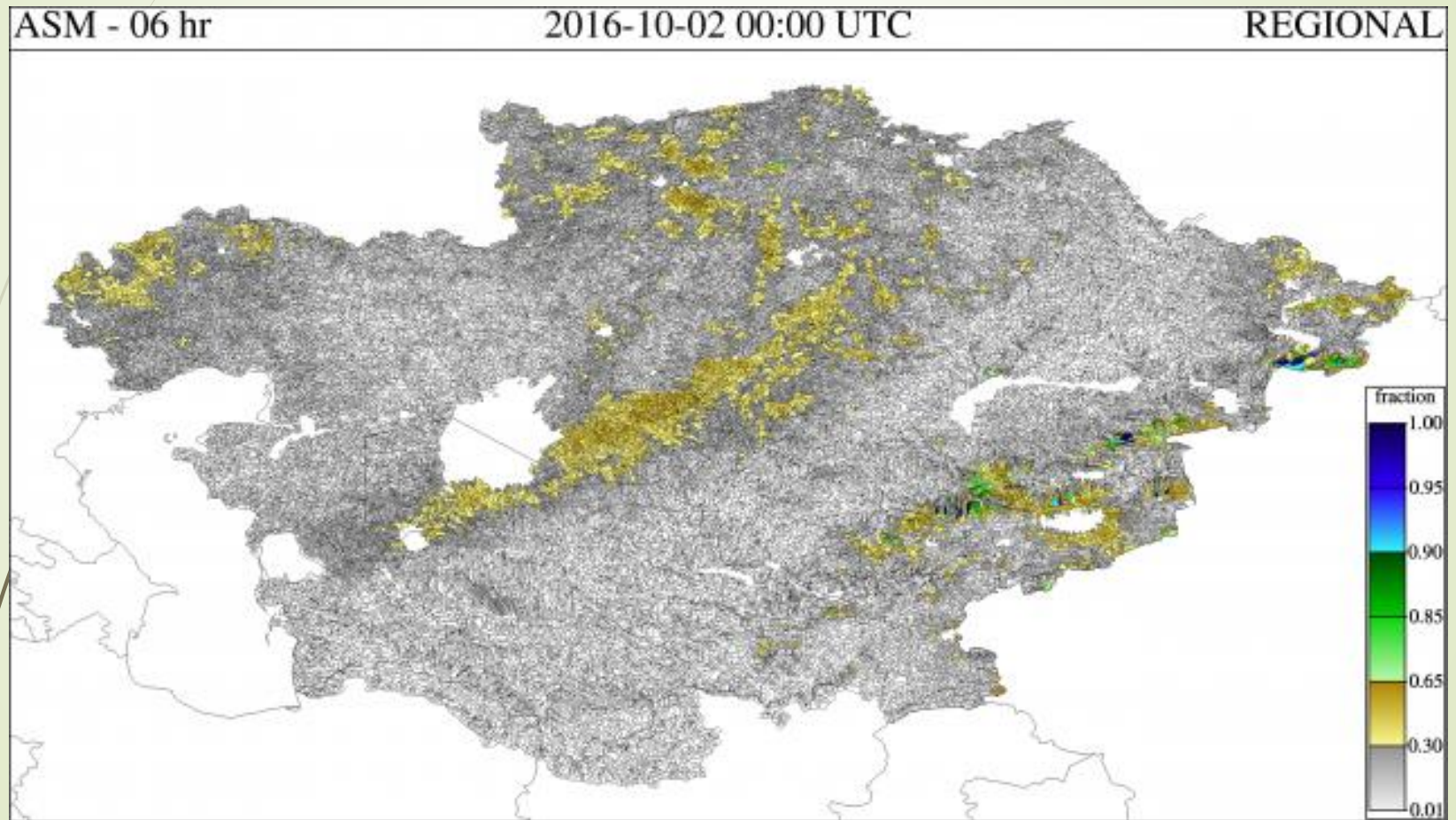
DT	MWGHE Precipitation	GHE Precipitation	Gauge MAP	Merged MAP	ASM	FFG	IFFT	PFFT
01-hr	 2016-10-02 00:00 UTC Text: view	 2016-10-02 00:00 UTC Text: view		 2016-10-02 00:00 UTC Text: view		 2016-10-02 00:00 UTC Text: view	 2016-10-01 19:00 UTC Text: view	 2016-10-02 00:00 UTC Text: view
03-hr	 2016-10-02 00:00 UTC Text: view	 2016-10-02 00:00 UTC Text: view		 2016-10-02 00:00 UTC Text: view		 2016-10-02 00:00 UTC Text: view	 2016-10-01 21:00 UTC Text: view	 2016-10-02 00:00 UTC Text: view
06-hr	 2016-10-02 00:00 UTC Text: view	 2016-10-02 00:00 UTC Text: view	 2016-10-02 00:00 UTC Text: view	 2016-10-02 00:00 UTC Text: view	 2016-10-02 00:00 UTC Text: view	 2016-10-02 00:00 UTC Text: view	 2016-10-02 00:00 UTC Text: view	 2016-10-02 00:00 UTC Text: view
24-hr	 2016-10-02 00:00 UTC	 2016-10-02 00:00 UTC	 2016-10-02 00:00 UTC	 2016-10-02 00:00 UTC				

There is relatively light observed precipitation.



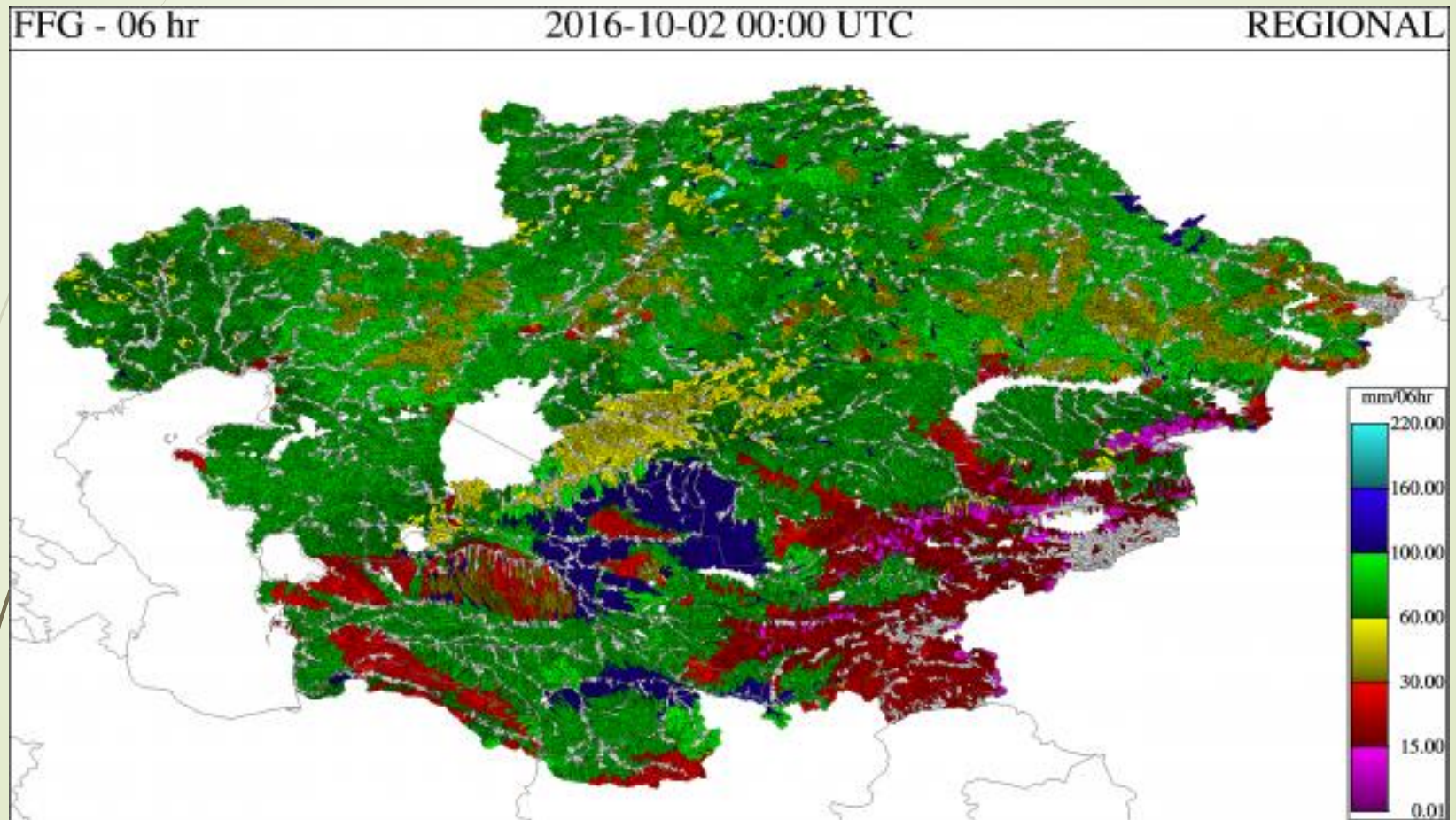
02 Oct 2016 00UTC

Upper soil moisture conditions are relatively dry.



02 Oct 2016 00UTC

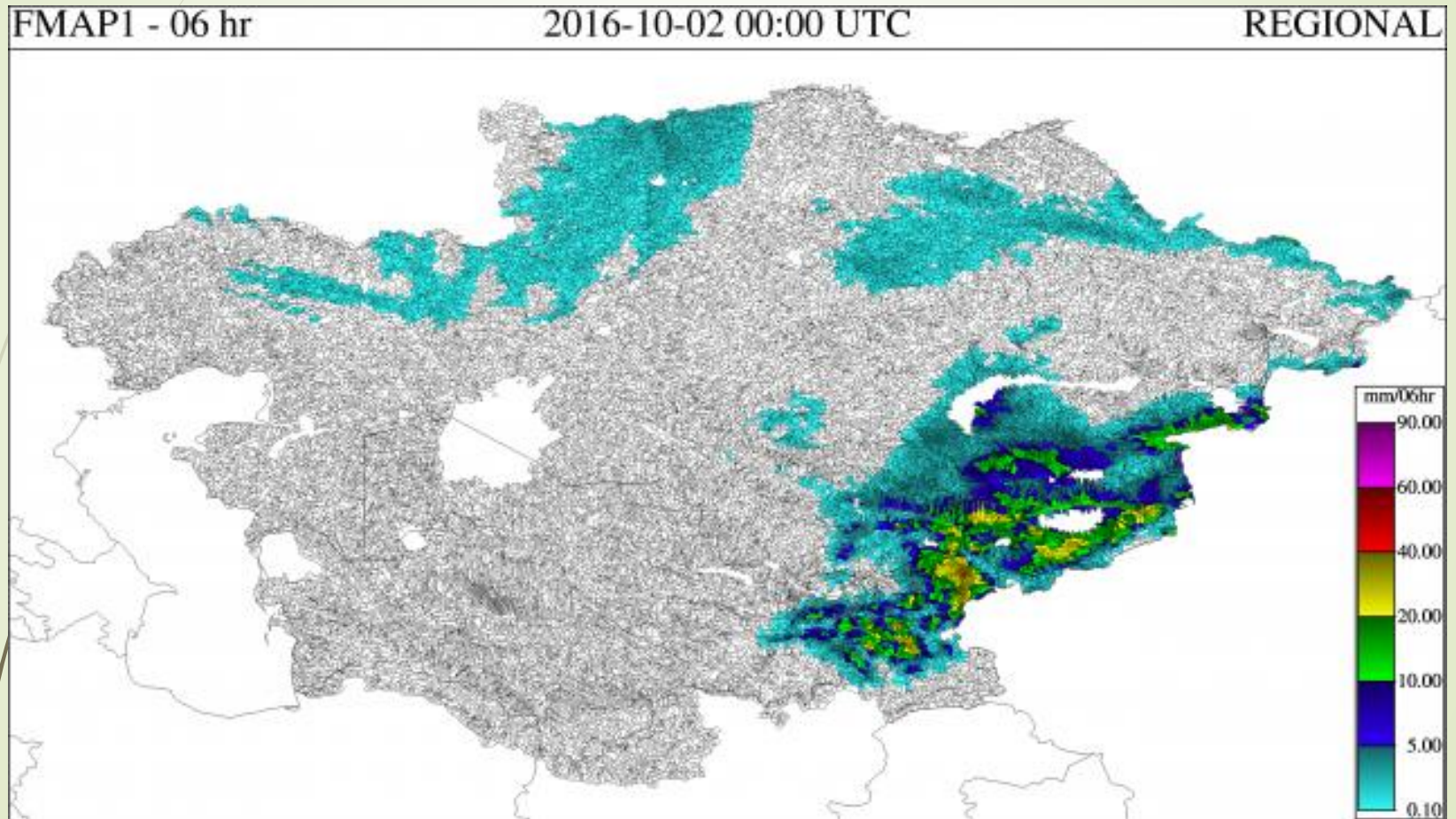
FFG values are generally higher than in prior example. Few basins in magenta color (~15 mm/6hr). FFG values in much of Tajikistan/Kyrgyzstan are about 20-30mm/ 6hr).



LITTLE OBSERVED PRECIP, DRY SOILS, FFG VALUES ARE NO EXTREMELY LOW ---
ARE YOU VERY CONCERNED JUST BASED ON THIS INFORMATION?

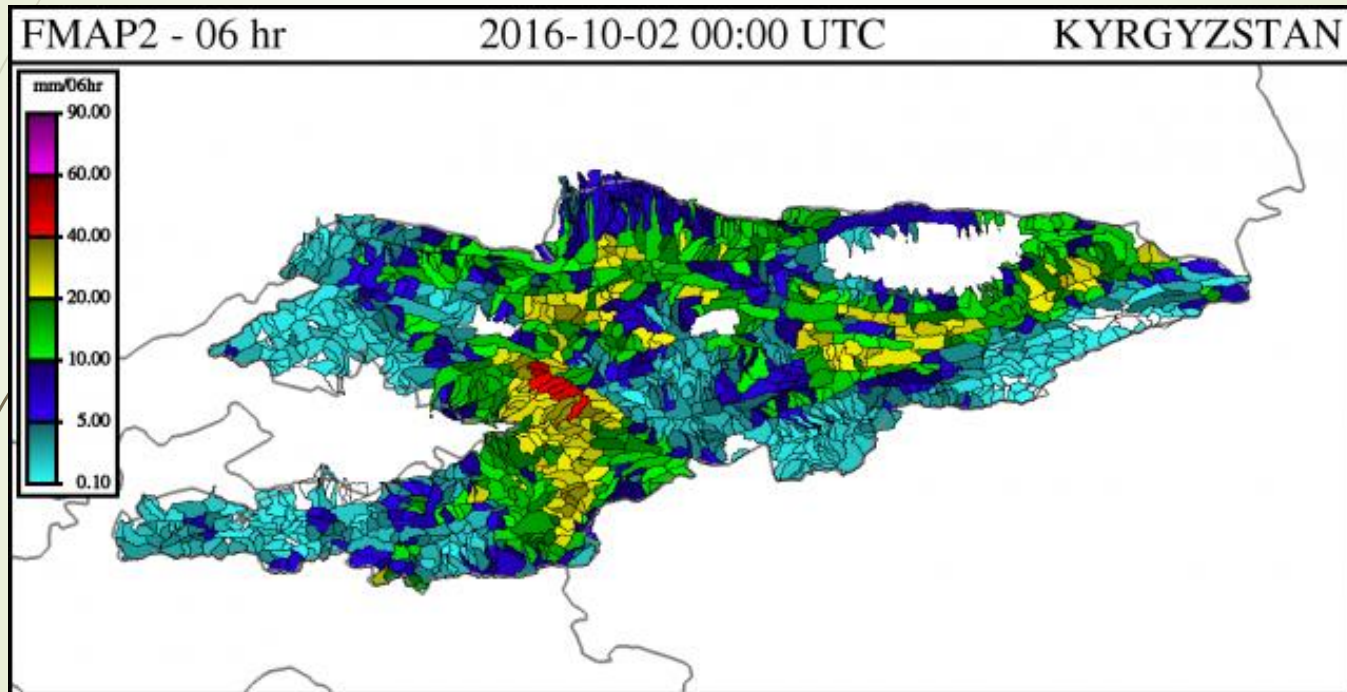
02 Oct 2016 00UTC

Forecast of precipitation is fairly heavy. Area in red exceeding 40 mm/hr.



02 Oct 2016 00UTC

This is FMAP from “inner domain” of WRF model (higher 4km resolution).
Several basins exceed 40 mm/6hr.



02 Oct 2016 00UTC

FFFT shows many basins colored with “orange” – forecast precipitation exceeds FFG by 10-25 mm.

DISCUSS FORECASTER DECISION

WHAT IS FORECASTER CONFIDENCE IN FORECAST OF PRECIPITATION?

WHAT OTHER INFORMATION CAN FORECASTER USE?

DO I MAKE A WARNING?

