NWS FORM E-5 (11-88) (PRES. by NWS Instruction 10-924)	**U.S. DEPARTMENT OF COMMERCE** NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION NATIONAL WEATHER SERVICE	HYDROLOGIC SERVICE AREA (HSA) **Tulsa, Oklahoma (TSA)**
MONTHLY REPORT OF RIVER AND FLOOD CONDITIONS		REPORT FOR: MONTH **November** YEAR **2013**
TO: Hydrometeorological Information Center, W/OH2 NOAA / National Weather Service 1325 East West Highway, Room 7230 Silver Spring, MD 20910-3283		SIGNATURE **Steven F. Piltz** (Meteorologist-in-Charge) DATE **December 6, 2013**

When no flooding occurs, include miscellaneous river conditions, such as significant rises, record low stages, ice conditions, snow cover, droughts, and hydrologic products issued (NWS Instruction 10-924)

[X] An "X" in the box indicates no flood stages were reached in this Hydrologic Service Area (HSA) during the month above.

November 2013 was a relatively dry month across all of eastern Oklahoma and northwest Arkansas, with temperatures also running below normal. Normal precipitation for November ranges from 2.6 inches in Pawnee County to 4.4 inches in Haskell County. Normal precipitation for the Ozark region of northwest Arkansas averages 4.2 inches.

Monthly Summary

Using the radar-derived estimated observed precipitation from the RFCs (Fig. 1a), rainfall totals for November 2013 ranged from 1"-3" across the majority of eastern OK and northwest AR. However, a few areas received 3" to around 4" of rain. All but a small sliver of northern Osage County had below normal precipitation for November 2013, with most of the area receiving only 25%-75% of the normal November rainfall (Fig. 1b).

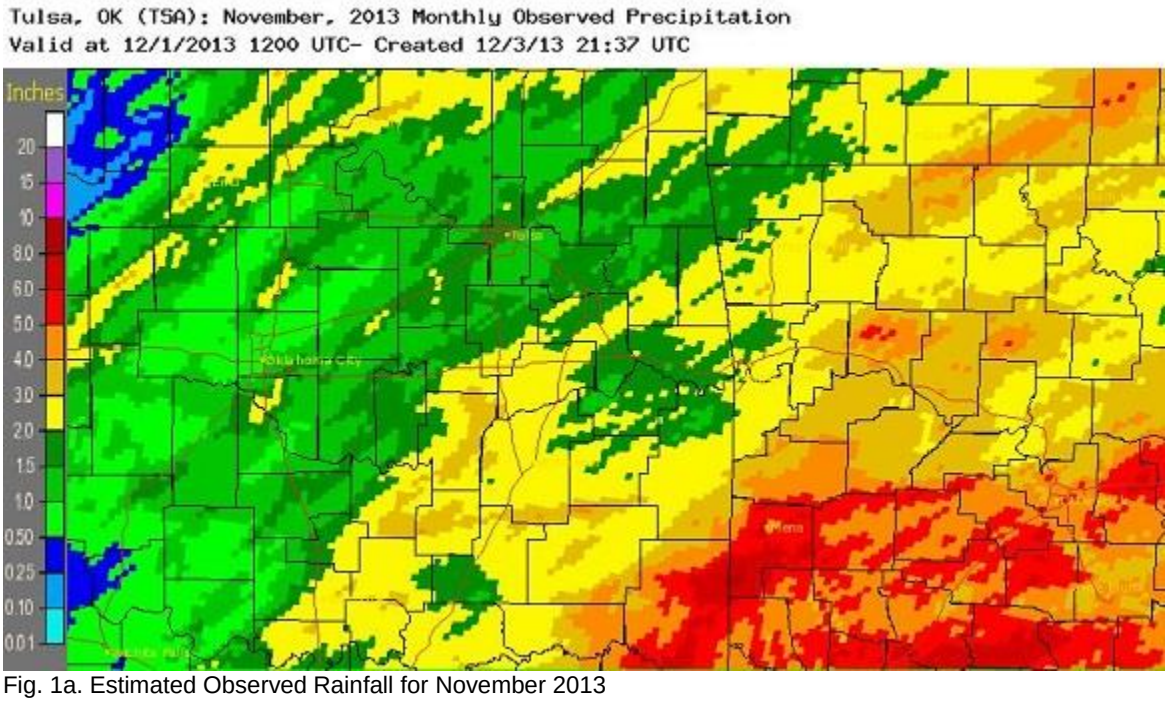

Fig. 1a. Estimated Observed Rainfall for November 2013

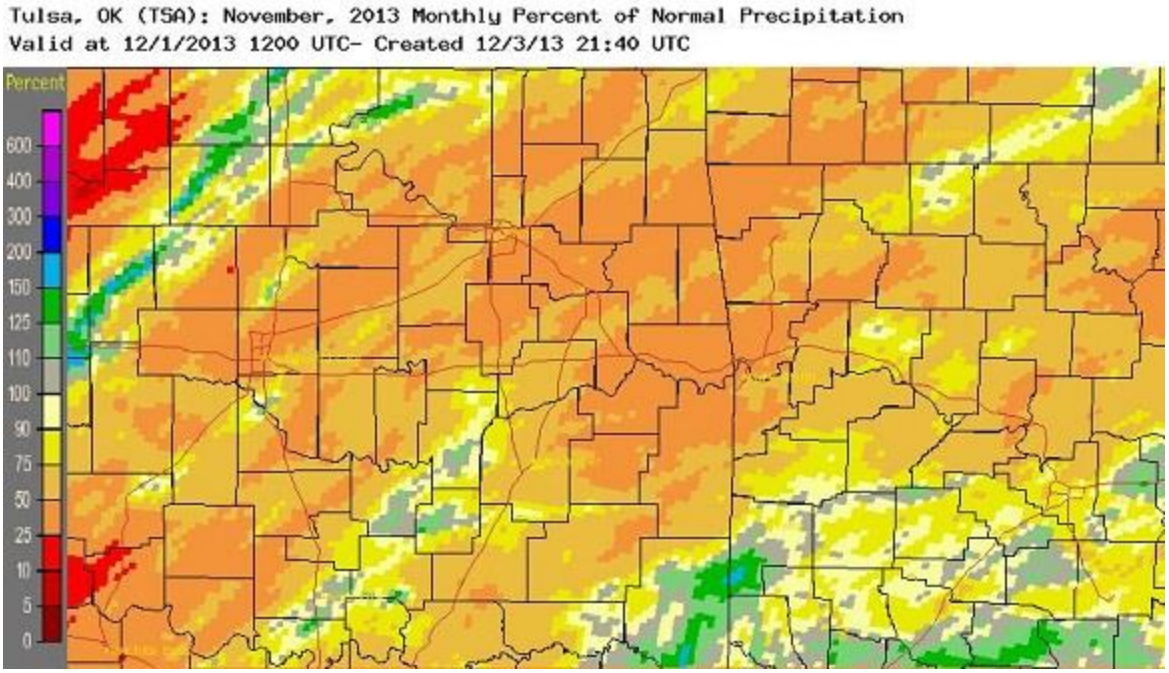

Fig. 1b. Estimated % of Normal Rainfall for November 2013

In Tulsa, OK, November 2013 ranked as the 26th coldest November (47.3°F; since records began in 1905) and the 60th driest November (1.91"; since records began in 1888). Fort Smith, AR was the 48th coldest November (49.7°F, tied 1940, 1984; since records began in 1882) and the 59th driest November (2.40", tied 1971; since records began in 1882). A trace of snow was also recorded in Fort Smith this month. Fayetteville, AR was the 11th coldest (44.2°F, tied 1968) and the 26th driest (2.24") November since records began in 1949. A trace of snow was also recorded in Fayetteville this month.

Some of the larger precipitation reports (in inches) for November 2013 included:

Cloudy, OK (meso)	4.38	Hugo, OK (meso)	3.73	Hindsville 10NNE, AR (coop)	3.42
Ozark, AR (coop)	3.40	Clayton, OK (meso)	3.37	Winslow, AR (coop)	3.34
St. Paul, AR (coop)	3.13	Talihina, OK (meso)	3.02	Antlers, OK (coop)	3.00

Some of the lowest precipitation reports (in inches) for November 2013 included:

Pawnee, OK (coop)	1.03	Hectorville, OK (meso)	1.20	Bixby, OK (meso)	1.21
Pawnee, OK (meso)	1.23	Wynona, OK (meso)	1.24	Jenks Riverside Arpt, OK (ASOS)	1.33
Ralston, OK (coop)	1.37	Inola, OK (meso)	1.53	Skiatook, OK (meso)	1.57
Oilton, OK (meso)	1.57				

According to the USACE, most of the major reservoirs in the HSA were operating within ±4% of the top of their conservation pools. A few lakes were still below normal: Skiatook Lake 75%, Heyburn Lake 77%, and Beaver Lake 94%.

According to the U.S. Drought Monitor (USDM) from November 26, 2013 (Figs 2, 3), Moderate (D1) Drought conditions continued in southern Choctaw County in southeast OK. Southern Rogers, Mayes, northern Wagoner, and Choctaw Counties were classified as Abnormally Dry (D0), but not experiencing drought conditions.

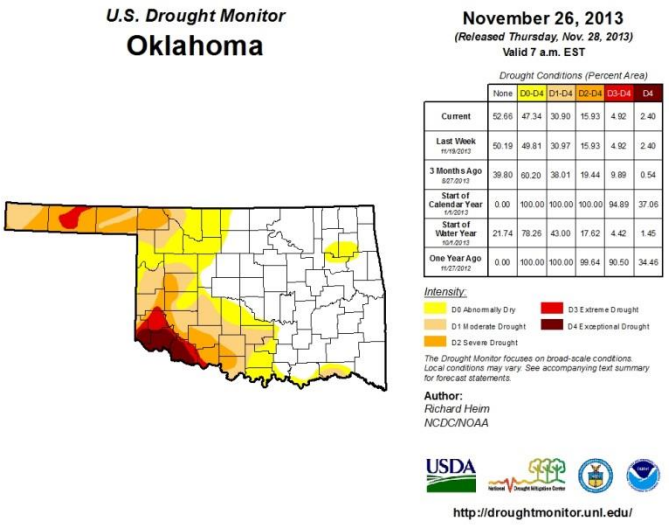

Fig. 2. Drought Monitor for Oklahoma

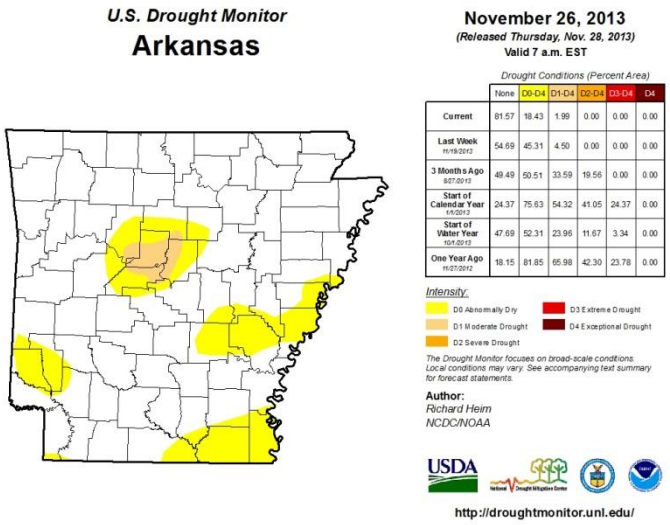

Fig. 3. Drought Monitor for Arkansas

Outlooks

The Climate Prediction Center (CPC) outlook for December 2013 (issued November 30, 2013) indicates a slightly enhanced chance for below median precipitation and equal chances for above, near, and below normal temperatures across all of eastern OK and northwest AR. This outlook is based primarily on short term forecasts of expected weather conditions during the first half of the month, as well as longer term climate anomalies.

For the 3-month period Dec-Jan-Feb 2013-14, CPC is forecasting an enhanced chance for above normal temperatures and equal chances for above, near, and below median rainfall across all of eastern OK and northwest AR (outlook issued November 21, 2013). According to CPC, ENSO neutral conditions remained through November. ENSO neutral conditions are expected to continue into at least late Spring 2014. Therefore, this outlook is based on both statistical and dynamical forecast tools.

Summary of Precipitation Events

November 1-15

Heavy rain in southeast KS at the end of October led to a rise on the Neosho River near Commerce at the beginning of November. The river rose above action stage, but remained just below flood stage when it crested on the 2nd.

Showers and thunderstorms developed across eastern OK and northwest AR on the 4th as a cold front approached the area and moisture from a tropical system over northern Mexico streamed into the region. The cold front then lifted back to the northwest before the main upper-level system pushed it through late on the 5th. Widespread showers and isolated thunderstorms affected the entire HSA ahead of the front on the 5th, and with the tropical moisture still in place, heavy rainfall occurred in some locations. The 2-day rainfall totals ranged from 0.75” to around 2” (Figs. 4, 5), with a majority of that falling with the second round of precipitation.

An upper-level disturbance moved across the region during the overnight hours of the 14th into the 15th. However, drier lower levels kept rainfall light. Most locations saw little to no rainfall, though 0.10” to near 0.50” occurred in some areas of northeast and east central OK, as well as northwest AR.

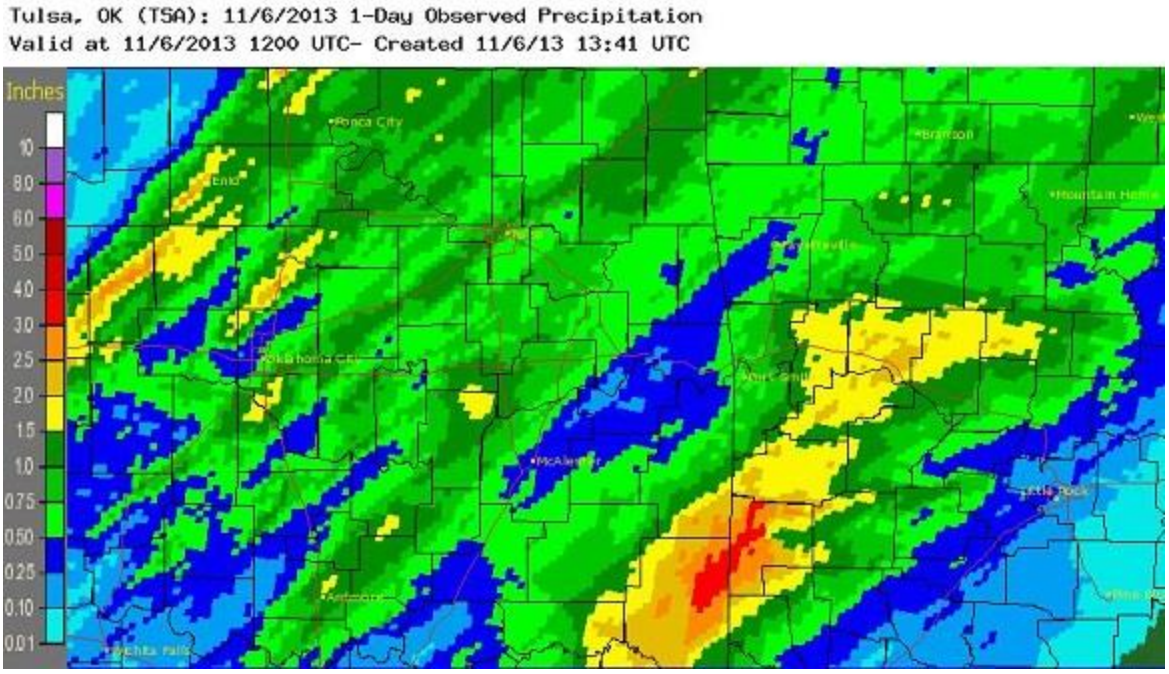

Fig. 4. 24-hr Estimated Observed Rainfall ending at 6am CST 11/06/2013

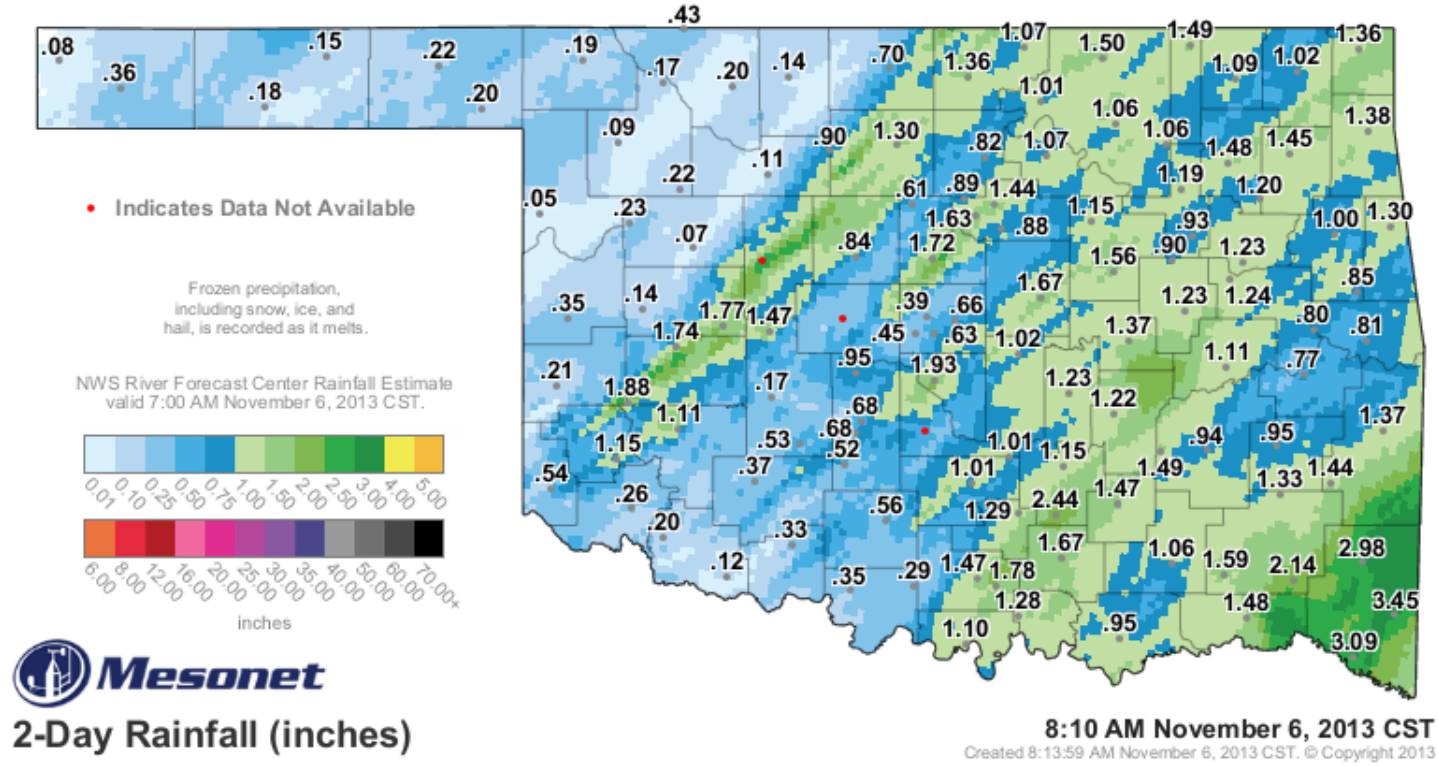

Fig. 5. 2-day Estimated (image) and Measured Rainfall ending at 8:10 am CST 11/06/2013

November 16-30

An upper low was spinning to the west brought several rounds of precipitation to eastern OK and northwest AR. Rainfall first began early on the 20th as showers and isolated thunderstorms developed within an area of warm air advection and strong low-level jet. A second round of rainfall moved across the area later that night and into the morning of the 21st. Most of this activity remained south of I-44 and north of a McAlester to Fort Smith line, where rainfall totals were generally 0.25" to around 1". A few locations in Washington (AR), Madison, and Carroll Counties received around 1.5" of rain. Southeast OK remained dry, while a few hundredths to around 0.25" fell north of I-44. The exception was northwest Osage County, which also received 0.50" to around 1" of rain.

The next round of showers and thunderstorms developed as an arctic cold front moved across the HSA on the 21st. This activity was focused mainly across southeast OK and west central AR during the afternoon and overnight hours, with rainfall totals of around 0.50" to around 1" southeast of a McAlester to Fort Smith line. Far southern Pittsburg, far southern Haskell, and far northern Pushmataha Counties had 1" to around 2" of rain. Light precipitation developed again during the late morning hours of the 22nd as another weak upper-level wave moved across the region. With shallow cold air over the area, some parts of northeast OK, generally west of Hwy 75, experienced sleet or freezing rain/drizzle. Liquid equivalent/rainfall totals from this activity were less than 0.10", and little to no ice accumulation occurred. A stronger wave brought another 0.25" to near 1" of rain to southeast OK later in the day.

Two rounds of a wintery precipitation mix affected locations generally along and south of I-40 on the 24th and into the early morning hours of the 25th, with patches of freezing drizzle in northeast OK and the higher terrain of northwest AR. Sleet and freezing rain/drizzle mainly affected travel, with slick roadways reported across the area. Little to no accumulation occurred with this activity, and rainfall/liquid equivalent totals were generally between 0.10" and 0.50".

Figure 6 shows the rainfall total across eastern OK and northwest AR from the 20th through 25th.

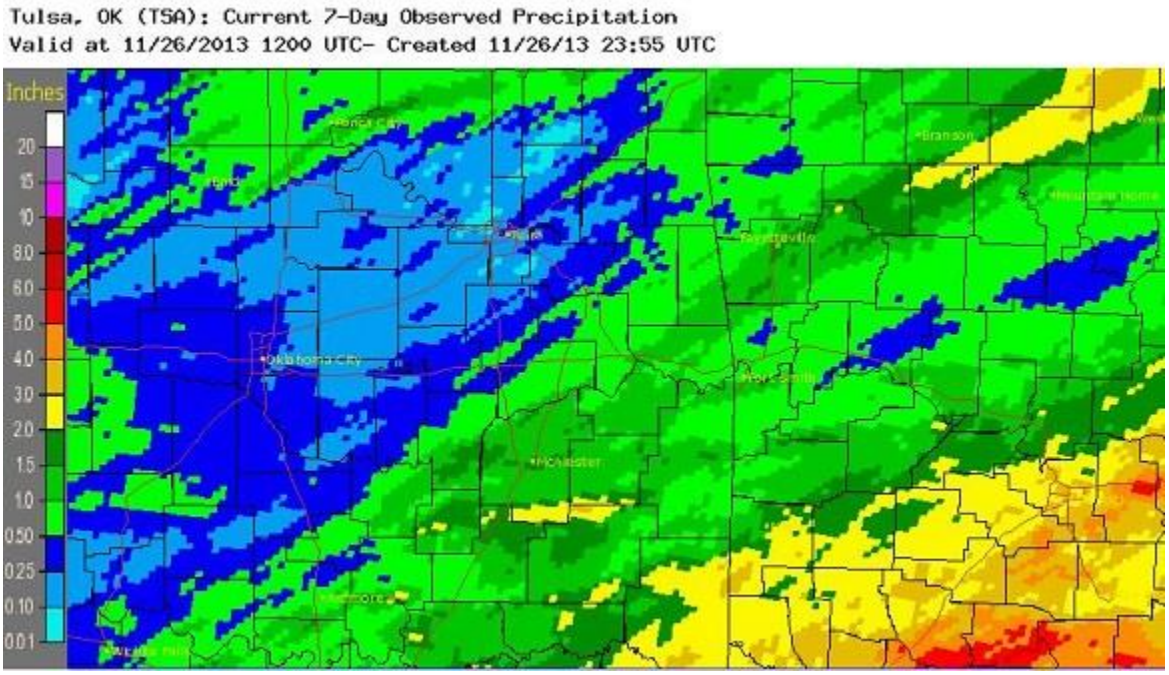

Fig. 6. 7-day Estimated Observed Rainfall ending at 6am CST 11/26/2013

Written by:

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WFO Tulsa

Products issued in November 2013:

*Mixed case River Flood products began July 31, 2013

0 Flash Flood Warnings (FFW)
0 Flash Flood Statements (FFS)
0 Flash/Areal Flood Watches (FFA) (0 Watch FFA CON/EXT/CAN)
0 Urban and Small Stream Advisories (FLS)
0 Areal Flood Warnings (FLW)
0 Areal Flood Statements (FLS)
1 River Flood Warnings (FLW)
3 River Flood Statements (FLS)

1 River Flood Advisories (FLS) (3 Advisory FLS CON/EXT/CAN)
0 River Flood Watches (FFA) (0 Watch FFA CON/EXT/CAN)
0 River Statements (RVS)
0 Hydrologic Outlooks (ESF)
0 Drought Information Statements (DGT)

Preliminary Hydrographs: