NIDIS Weekly Climate, Water and Drought Assessment Summary

Upper Colorado River Basin

January 3, 2012

Precipitation and Snowpack

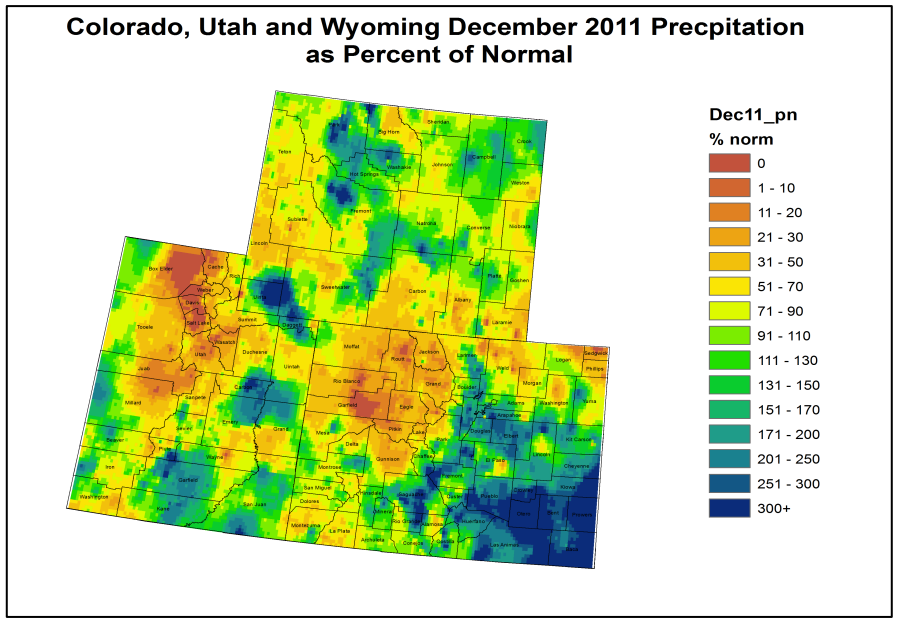


Fig. 1: December precipitation as a percent of average.

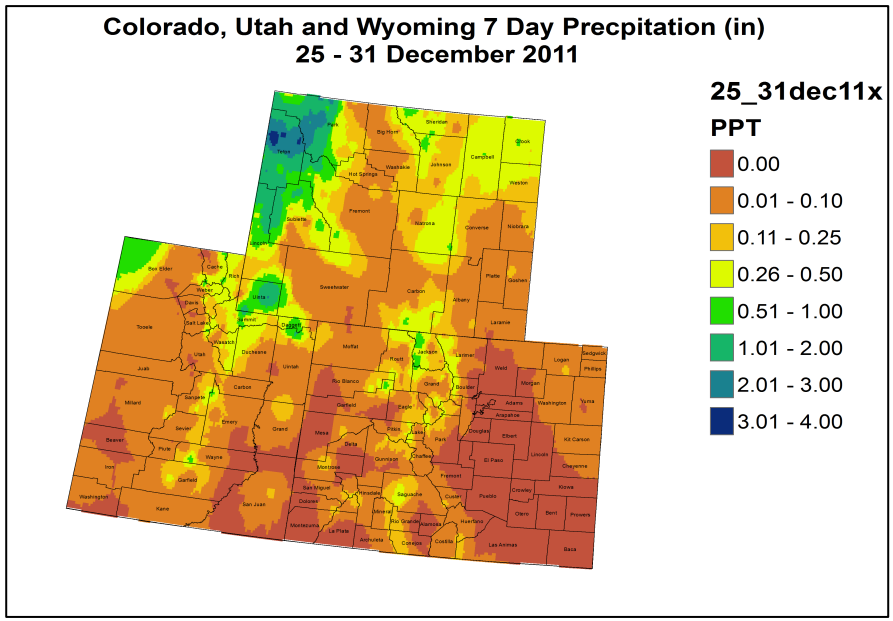


Fig. 2: December 25 – 31 precipitation in inches.

For the month of December, precipitation favored the southern and western portions of the Upper Colorado River Basin (UCRB, Fig. 1). The San Juan mountains and the Four Corners region received around 100% of its average December precipitation. Areas in eastern Utah and southwest Wyoming received over 150% of average precipitation for the month. Northwest Colorado was much drier in December, with most areas receiving less than 50% of average. The drought-stricken southeast CO has seen significant improvement, with most of the region receiving over 200% of average precipitation for the month.

Last week, the heaviest precipitation fell in the Upper Green River basin with amounts in the higher elevations totaling more than a quarter inch (Fig 2). The higher elevations in northern CO also received over a quarter inch of precipitation last week. Scattered amounts between .01 and .10 inches fell throughout the basin and northeast CO, but the majority of CO east of the Continental Divide and several areas in the southern portion of the UCRB received no precipitation last week.

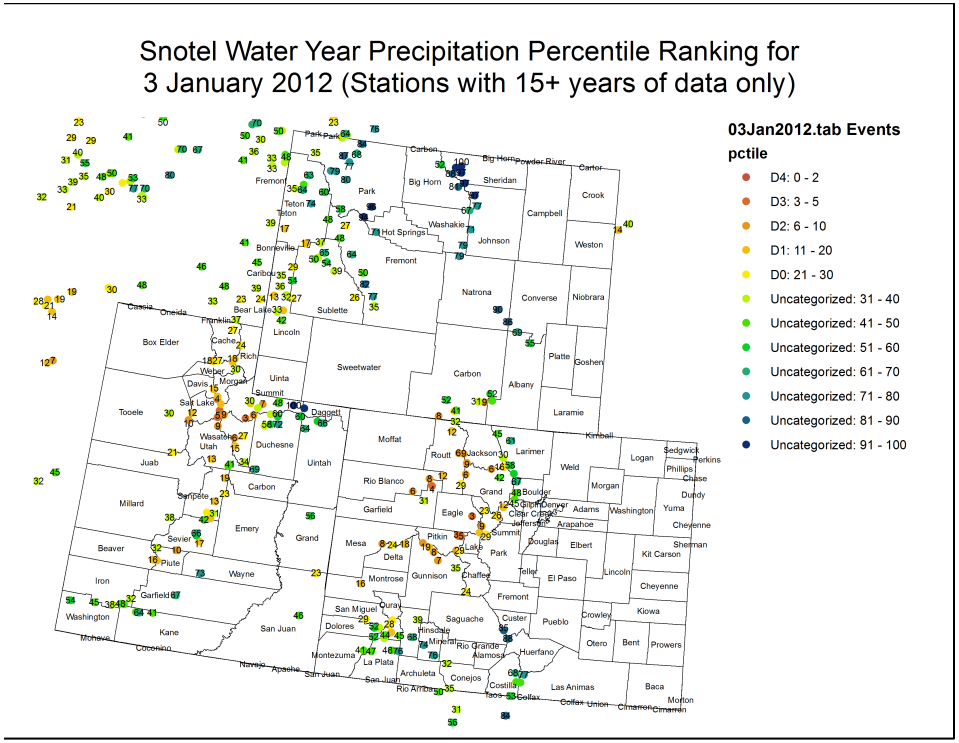


Fig. 3: SNOTEL WYTD precipitation percentiles (50% is median, 21 – 30% is Drought Monitor D0 category).

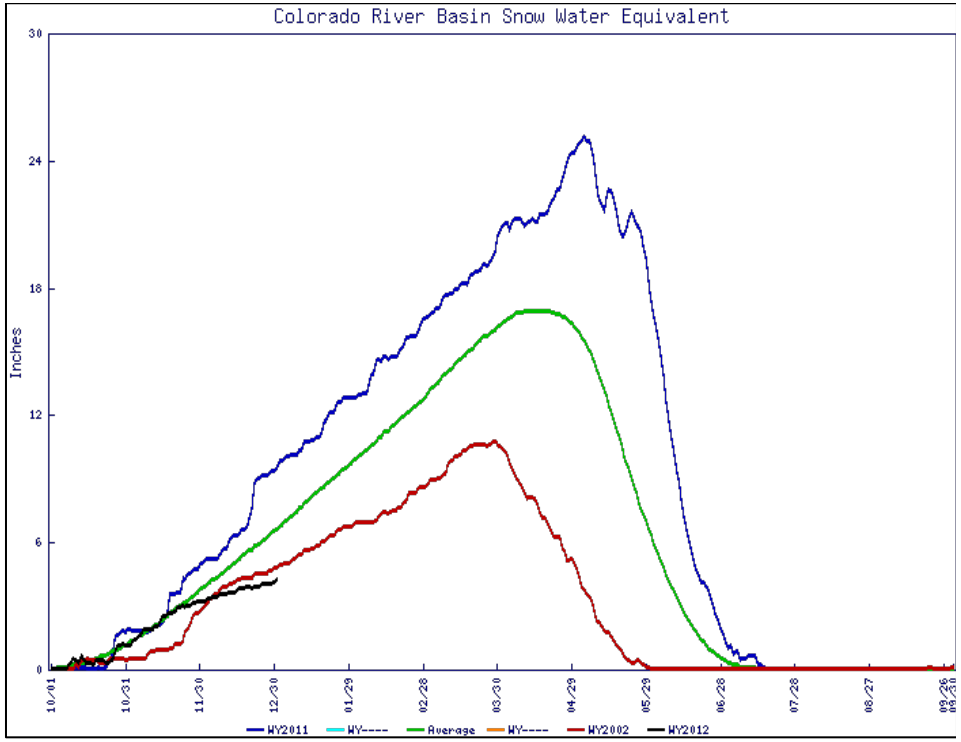


Fig. 4: Colorado headwaters WYTD snow water equivalent accumulation (black line) compared to the average (green).

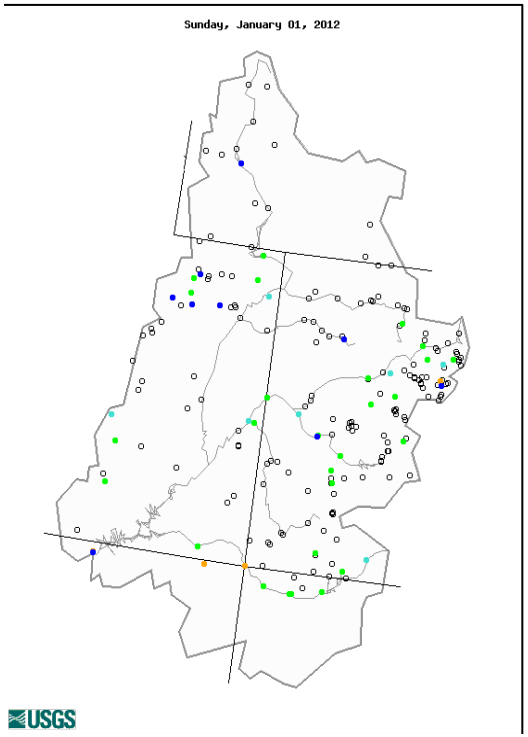
Water-year-to-date (WYTD), SNOTEL precipitation is near average for the southern part of the UCRB and now below average for much of the northern portions of the basin (Fig. 3). The lowest percentiles are currently being observed around the Gunnison basin in CO, near the Colorado River headwaters, and along the Wasatch range in UT, with many sites recording below the 20th percentile. The San Juan mountains are seeing more significant snowpack this year, with most sites near or above the 50th percentile. Some sites along the Duchesne River in UT and along the northern edge of the UCRB in WY are also maintaining snowpack accumulations near or above the 50th percentile.

Around the headwaters of the Colorado River, very little snow has accumulated since the beginning of December (Fig. 4). With accumulations stagnating, the headwaters region (along with many other central and northern regions of the UCRB) is now experiencing below average snowpack. Snowpack accumulations are now currently less than they were at this time during the 2002 drought year.

Streamflow

As of January 1st, 91% of the USGS streamgages in the UCRB recorded normal (25th – 75th percentile) or above normal 7-day average streamflows (Fig. 5). About 34% of the gages in the basin are recording above normal flows, while 9% of the gages in the basin are recording below normal flows. The number of reporting gages in the basin has decreased from over 100 in mid-November to just below 50, as many portions of the rivers are frozen over. There are currently only 3 gages recording below normal flows and are scattered across the basin.

Key gages on the Colorado River at the CO-UT state line and the San Juan River near Bluff, UT are all currently recording flows in the normal range at the 68th and 43rd percentiles, respectively (Fig. 6). The gage on the Green River at Green River, UT had been recording above normal flows, but as of last week has become "ice affected" and is not currently recording streamflow. Fig. 6 has not been updated in the last 2 weeks as there are currently website difficulties.



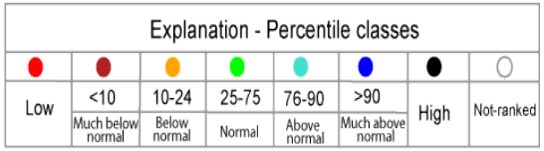


Fig. 5: 7-day average discharge compared to historical discharge for January 1st.

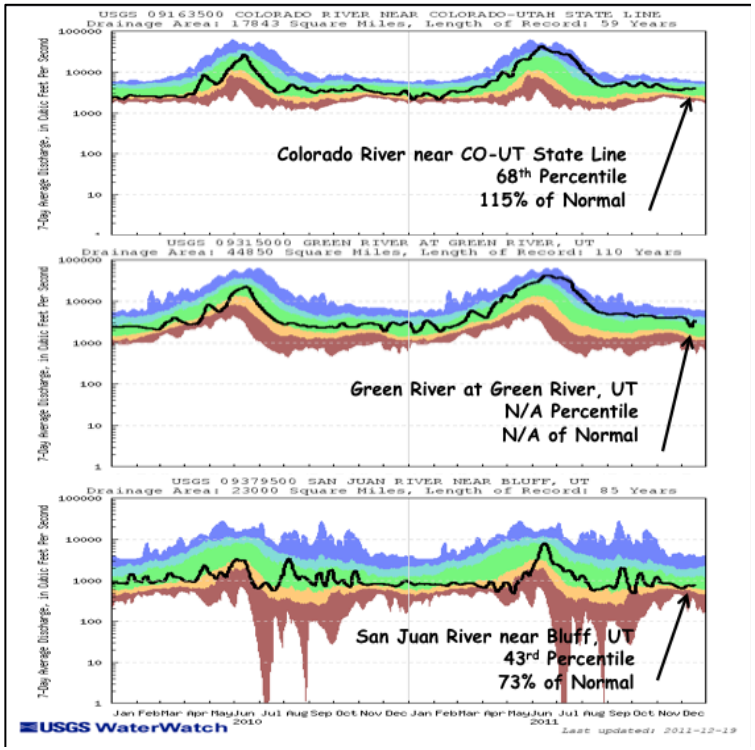


Fig. 6: USGS 7-day average discharge over time at the CO-UT stateline (top), Green River, UT (middle) and Bluff, UT (bottom).

Water Supply and Demand

Much of the UCRB experienced colder than average temperatures for the month of December. Much colder than average temperatures were seen in southeast CO. The VIC model continues to show dry soil moisture conditions in southeast CO and in UT around the Colorado River valley (Fig. 7). Drying conditions are also showing up in southern WY. Even though wet soils are still being observed over the Colorado Headwaters region, the spatial extent is decreasing and the soils are beginning to dry a little.

All of the major reservoirs above Lake Powell are above their January averages. Except for Navajo and Lake Granby, all of the major reservoirs in the UCRB are above their storage levels for the same time last year. Flaming Gorge, Granby, Navajo and Dillon have stayed near steady for the month, while Blue Mesa, Green Mountain, and Lake Powell have seen larger decreases. Lake Powell is currently at 66% of capacity and 86% of average.

Precipitation Forecast

Most of the UCRB is currently under dry and mild conditions as a ridge of high pressure centers itself over the western US today. Expect this pattern of benign weather to persist through the rest of the week as the high pressure ridge remains firmly anchored over the region (Fig. 8). A minor change is anticipated over the weekend as a series of quick moving disturbances are set to cross the northern Rockies beginning on Friday. The first of these waves is not expected to produce much in the way of precipitation for all but the northernmost fringes of the basin in Wyoming. A second, slightly stronger disturbance is predicted to follow late day on Saturday but will also be severely hindered by a lack of moisture. As a result expect accumulating snow to be confined to the highest terrain of southeast Wyoming and northern Colorado, where precipitation totals should remain below 0.10 inches of liquid through Sunday. The ridge rebuilds over the UCRB on Monday, bringing a return to dry conditions and above average temperatures for early next week.

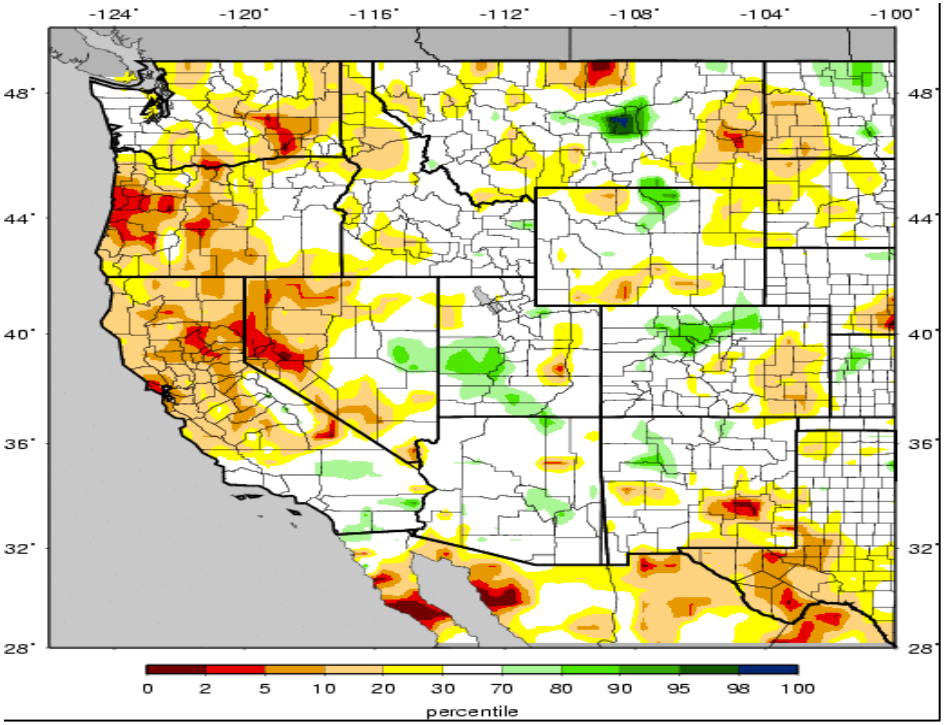


Fig. 7: VIC soil moisture percentiles as of January 1st.

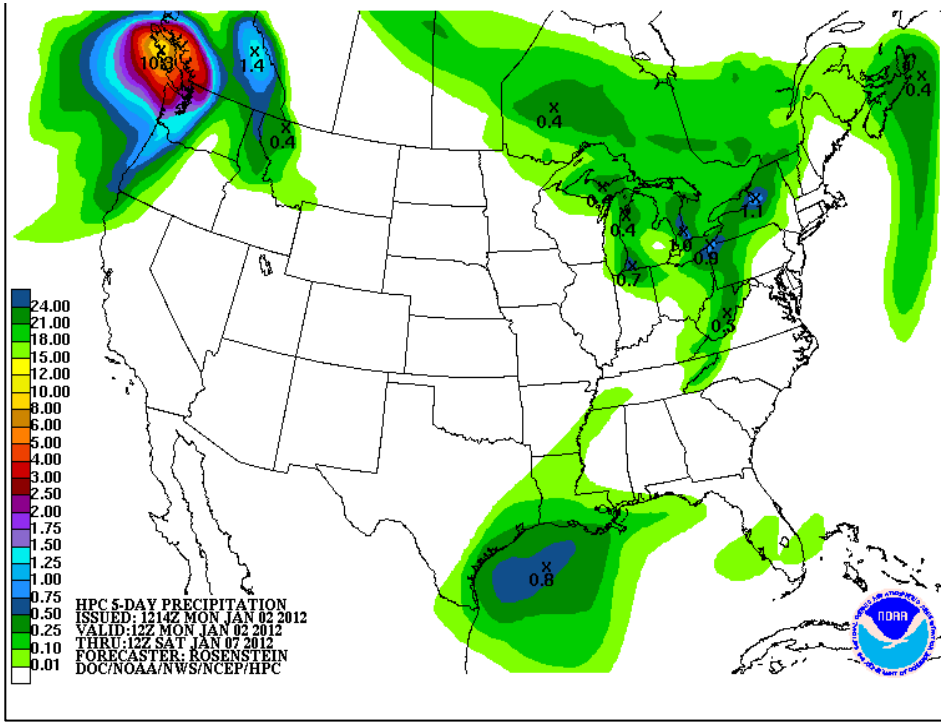
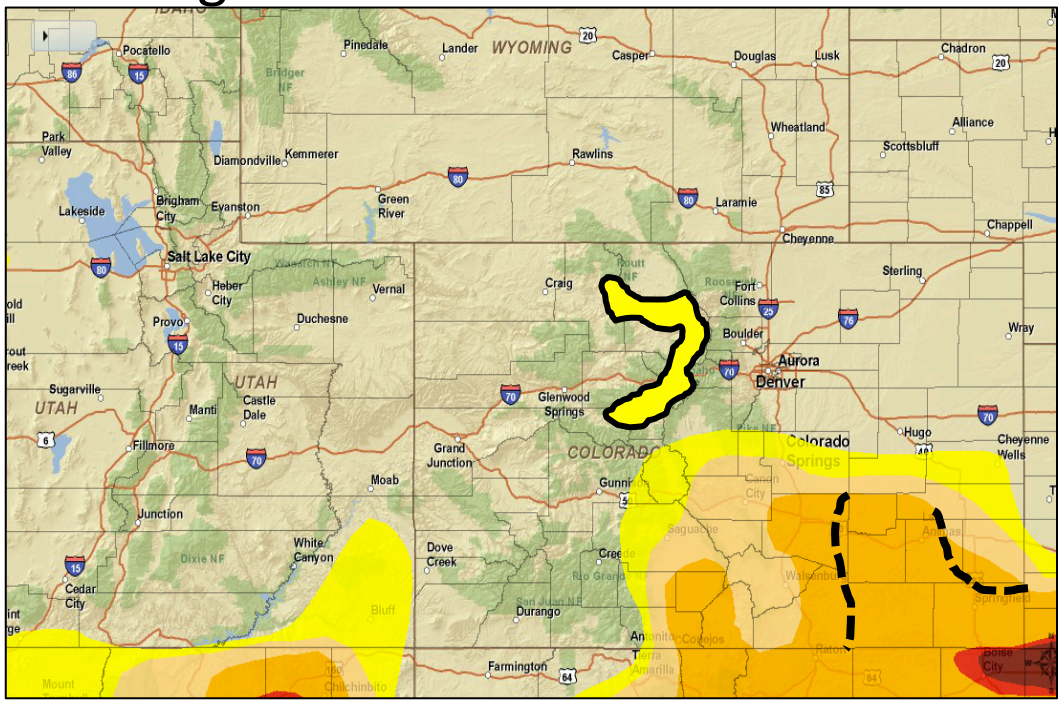
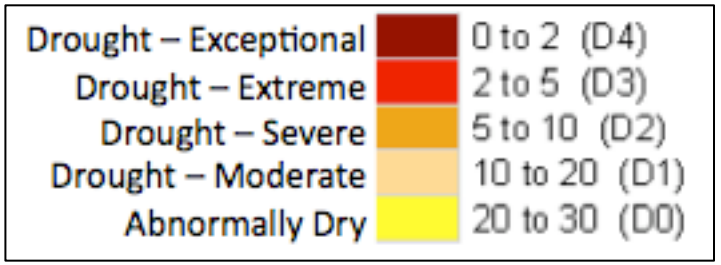


Fig. 8: HPC Quantitative Precipitation Forecast (QPF) through 12Z Saturday.

Drought and Water Discussion





Drought categories and their associated percentiles

Fig. 9: December 27th release of U.S. Drought Monitor for the UCRB

Dry conditions are currently being observed in the northern CO mountains and along the Continental Divide at Grand and Summit counties in the UCRB, and warrants the introduction of D0 to the U.S. Drought Monitor (USDM) map (Fig. 9, black outline). Snowpack is below average for this time of year, with SNOTEL precipitation at many sites below the 20th percentile. Standardized precipitation indices (SPIs) in the region are below -1.5 on the 30 and 60 day time scales, and still negative on longer time scales. Impacts are an issue now as news stories are reporting the low snowpack conditions occurring. Status quo is recommended for the rest of the UCRB.

After a large blizzard moved across southeast CO in late December, dropping more than an inch of liquid over most of the area (in addition to decent accumulations for the rest of the month), conditions have significantly improved. SPIs on short time scales out to 6 months are either positive or only slightly negative, with D1 justified on the 9-month SPI time scale. A trimming of D2 in the region is recommended (Fig. 9, dashed lines).