Shallow Aquifer Water Level Contouring

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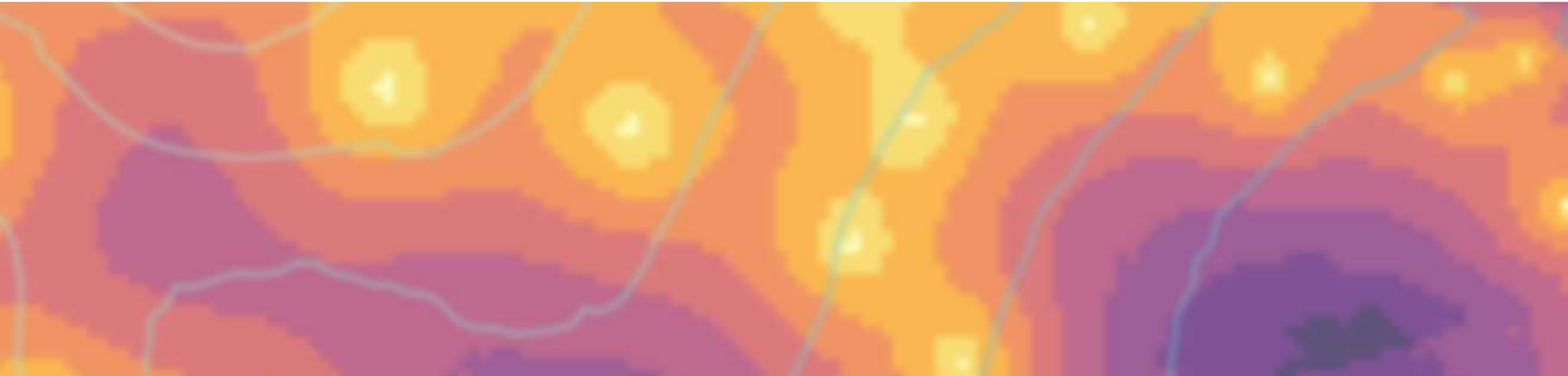
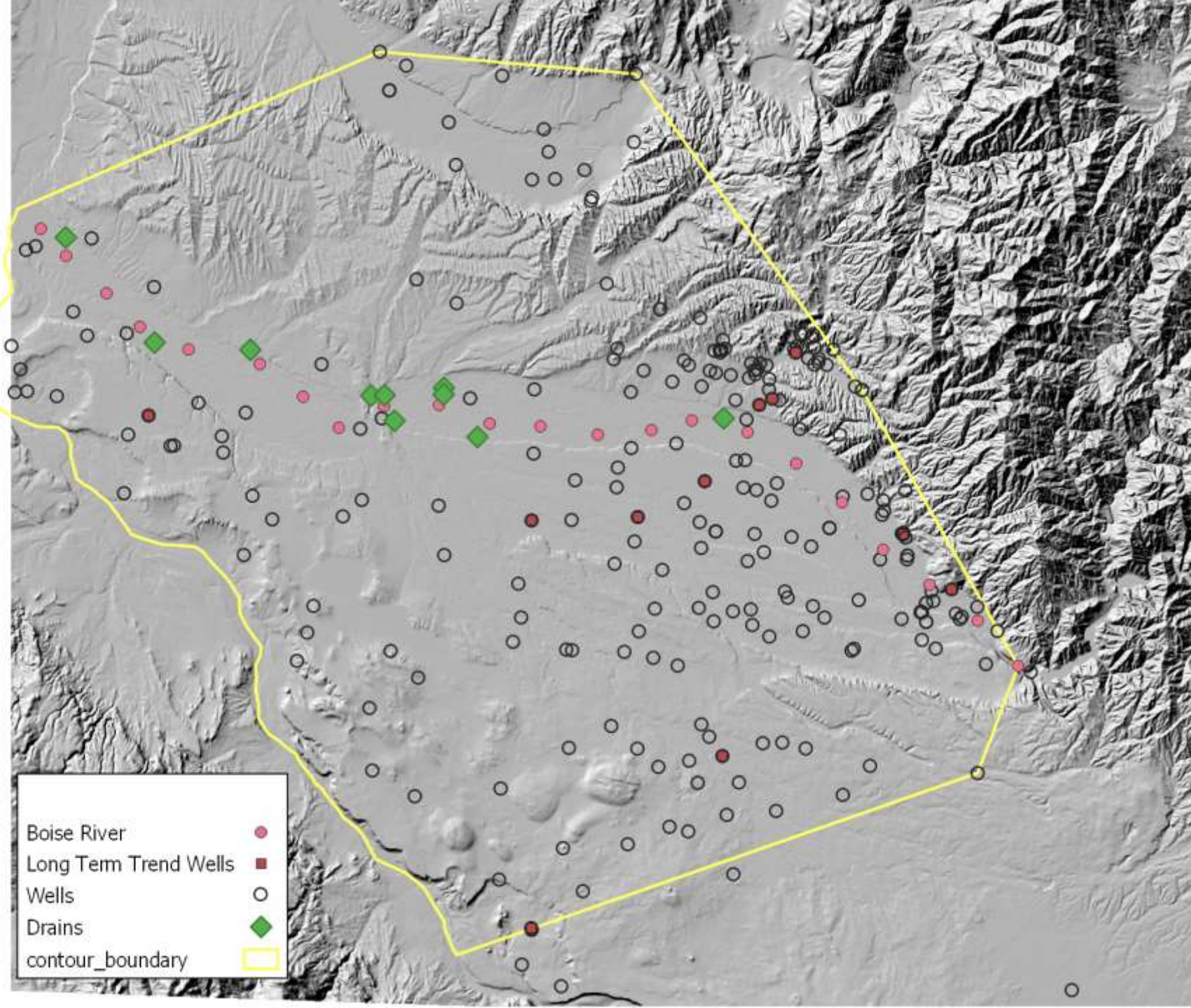
IDAHO DEPARTMENT OF
WATER RESOURCES

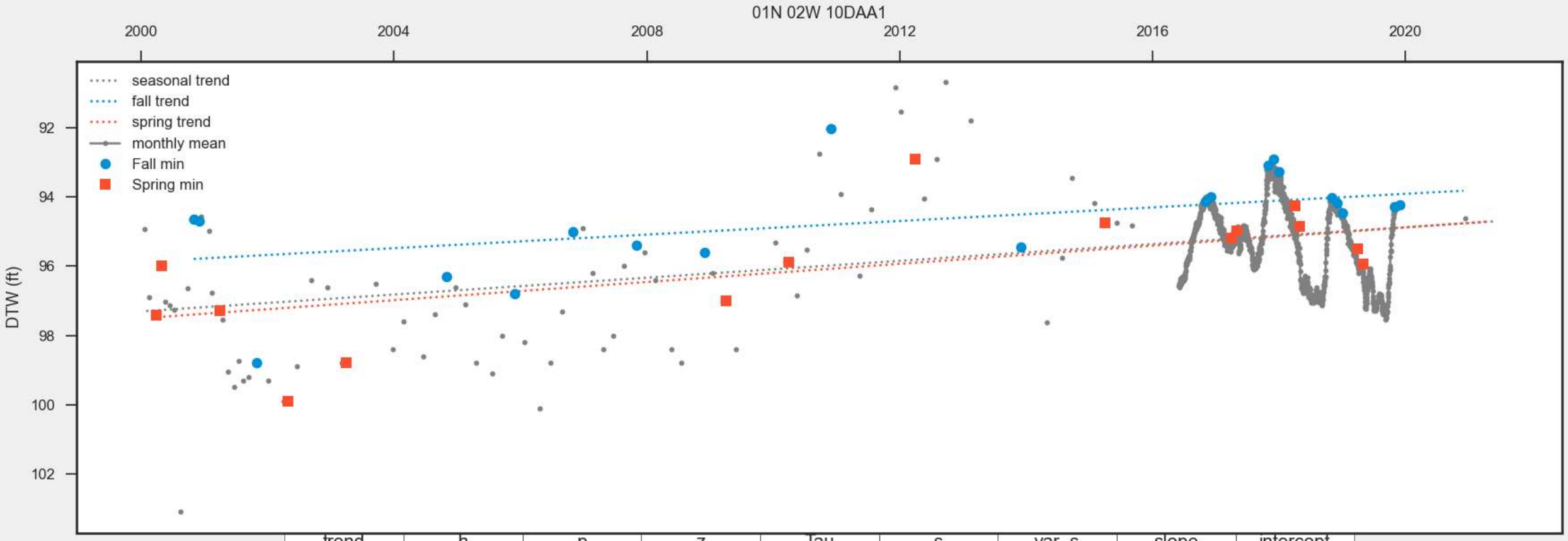


Contouring dataset

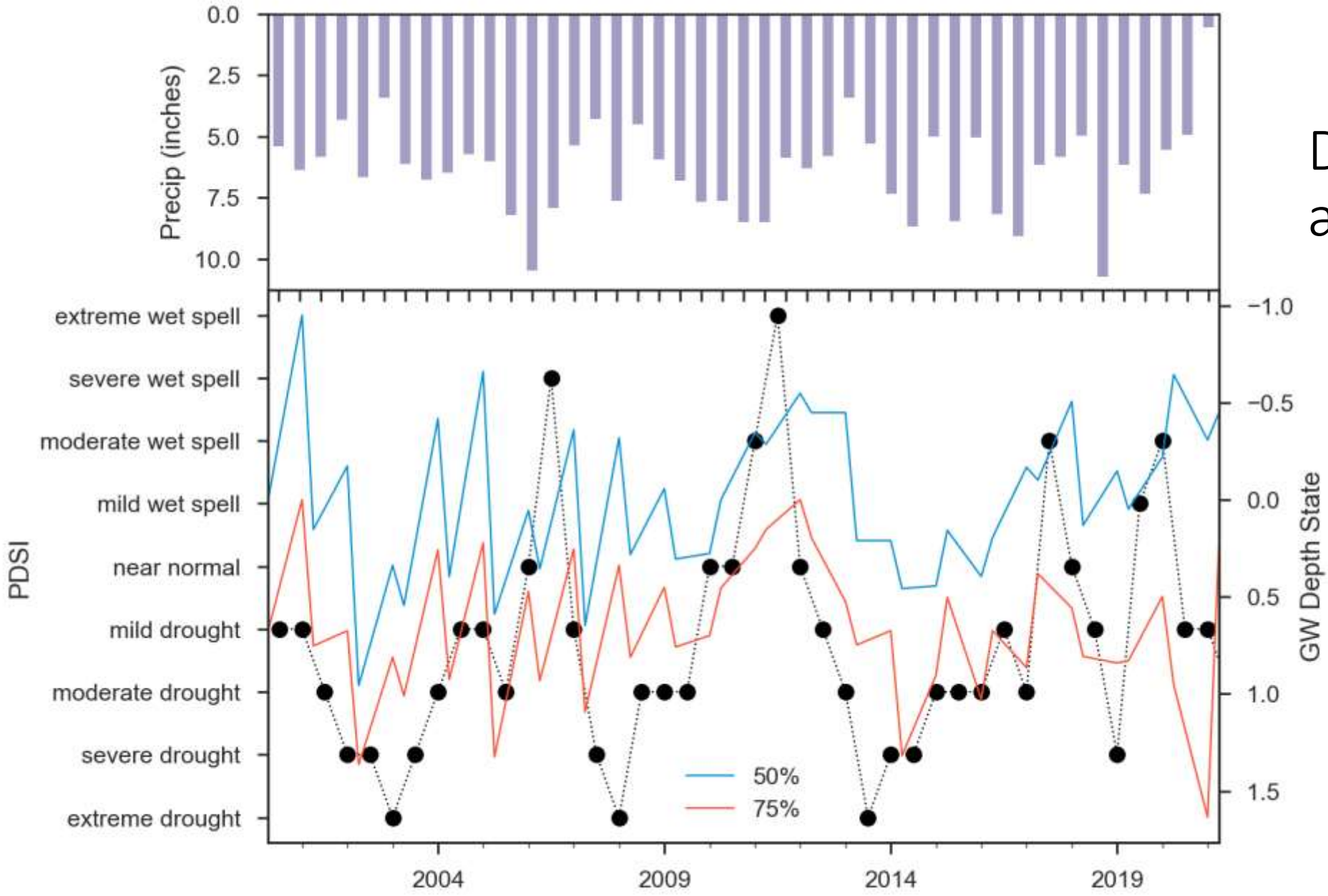
- Water Levels in 242 wells
  - Screened in model layers 1 and/or 2
- Additional Hydrologic Information
  - Boise River
    - 22 points from Lucky Peak to Parma picked from DEM
  - Drain gages
    - Datum from USGS
  - Wells with no trend in well data per Mann-Kendall test for trend



Trendless Water Levels



	trend	h	p	z	Tau	s	var_s	slope	intercept
seasonal	decreasing	True	0.0	-5.082	-0.354	-218	1823.333	-0.122	97.296
fall	no trend	False	0.056	-1.914	-0.316	-60	950.0	-0.008	95.792
spring	decreasing	True	0.038	-2.078	-0.41	-43	408.333	-0.011	97.486

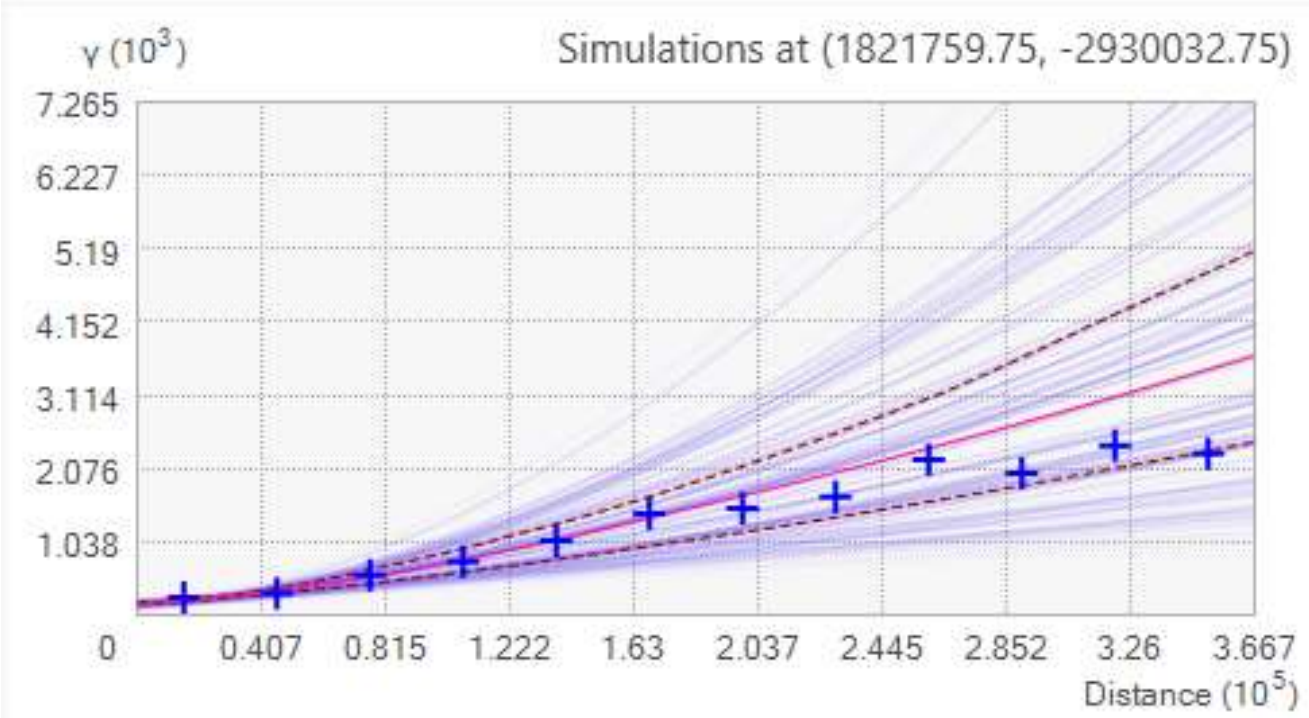


Drought and aquifer level state

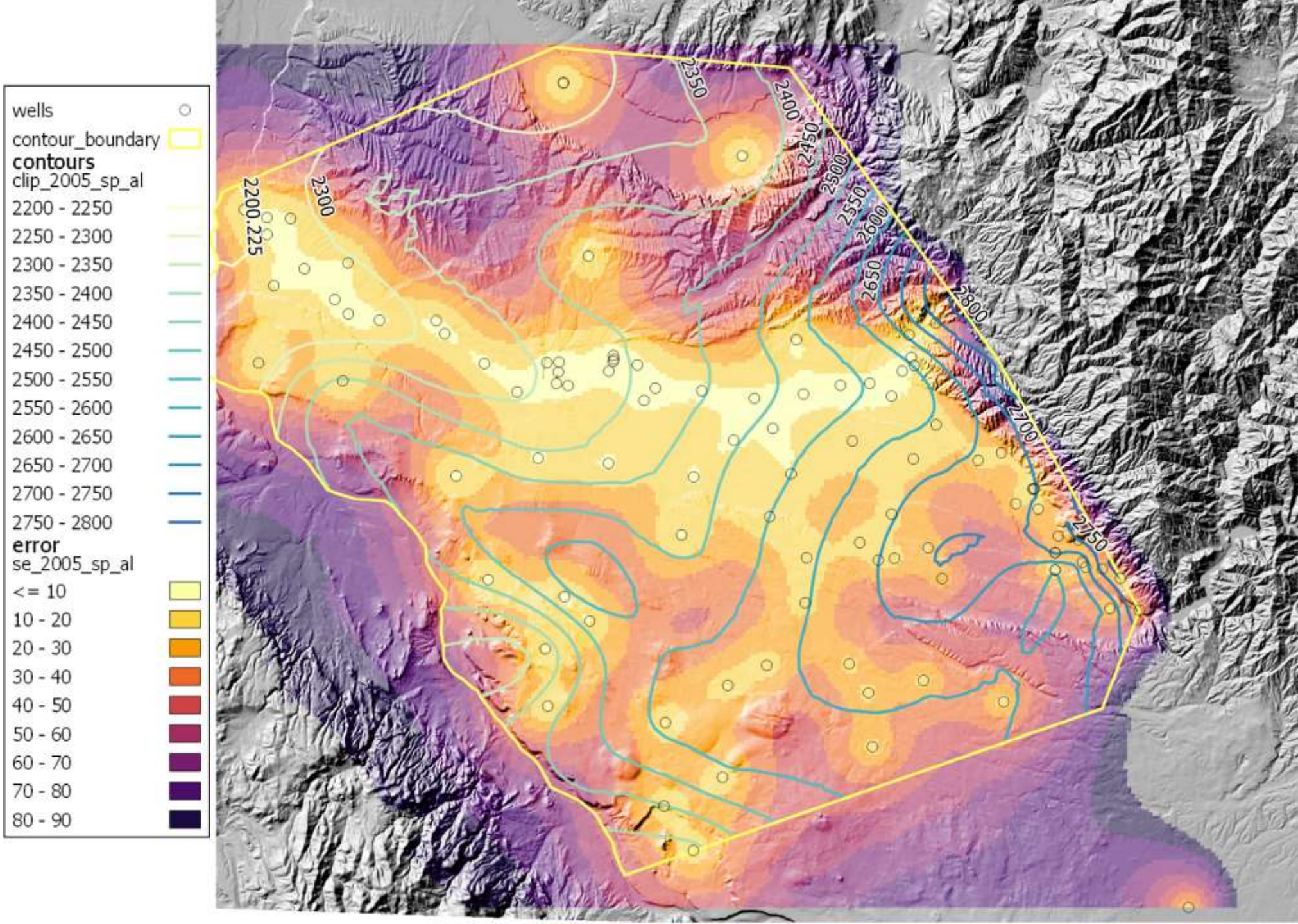
- Low
  - Spring 2005
- Normal
  - Fall 2001
- High
  - Spring 2012

Empirical Bayesian Kriging

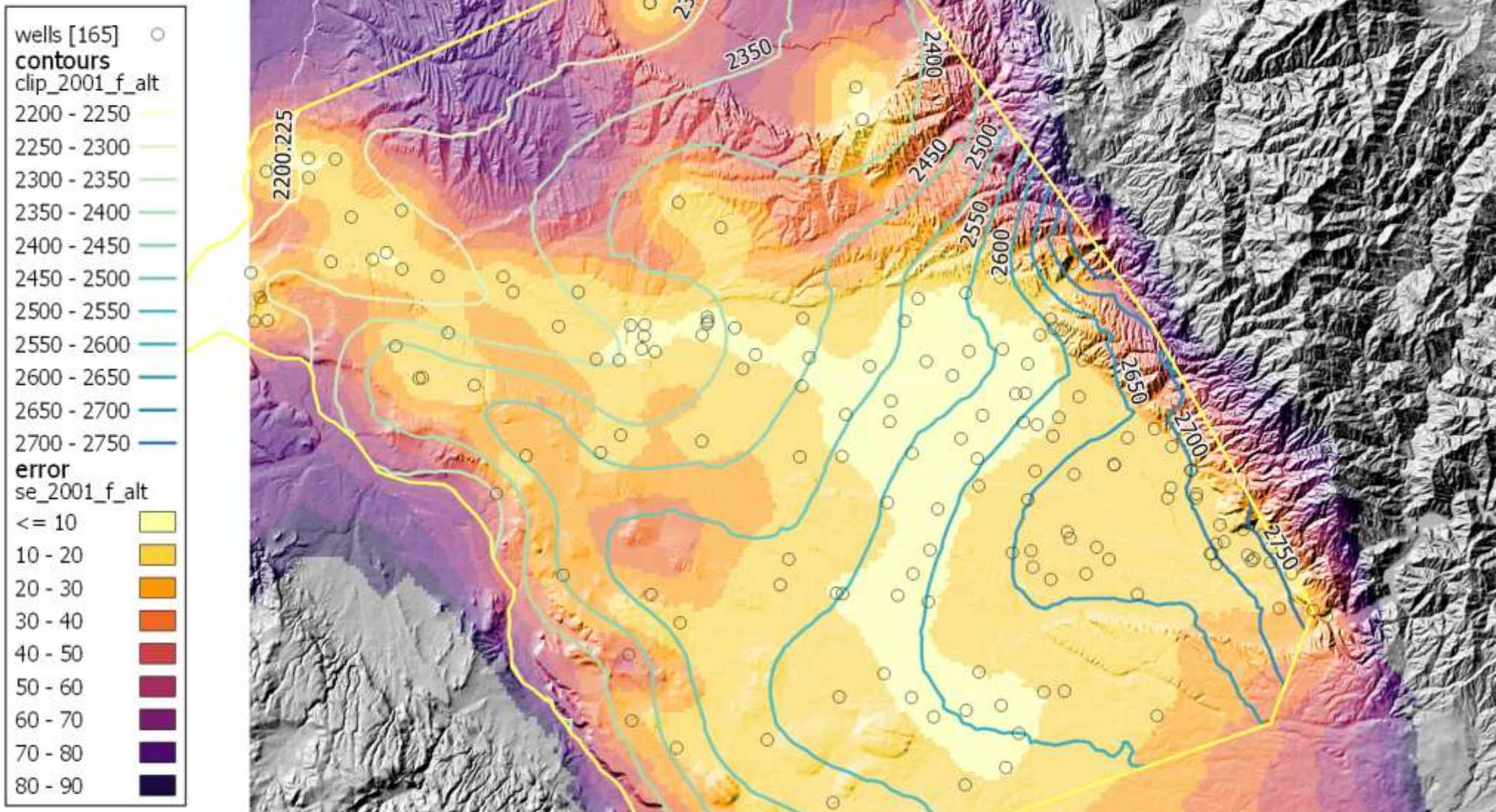
- Automated selection of variogram parameters (range, nugget, sill)
- Accounts for uncertainty of variogram selection (error typically underestimated in other methods)
- Corrects for trends in data
- Multiple variograms estimated based on subsets of data.
- Predictions use variograms simulated from all subsets to which neighboring points belong
- K-Bessel Detrended variogram model with empirical data transform used



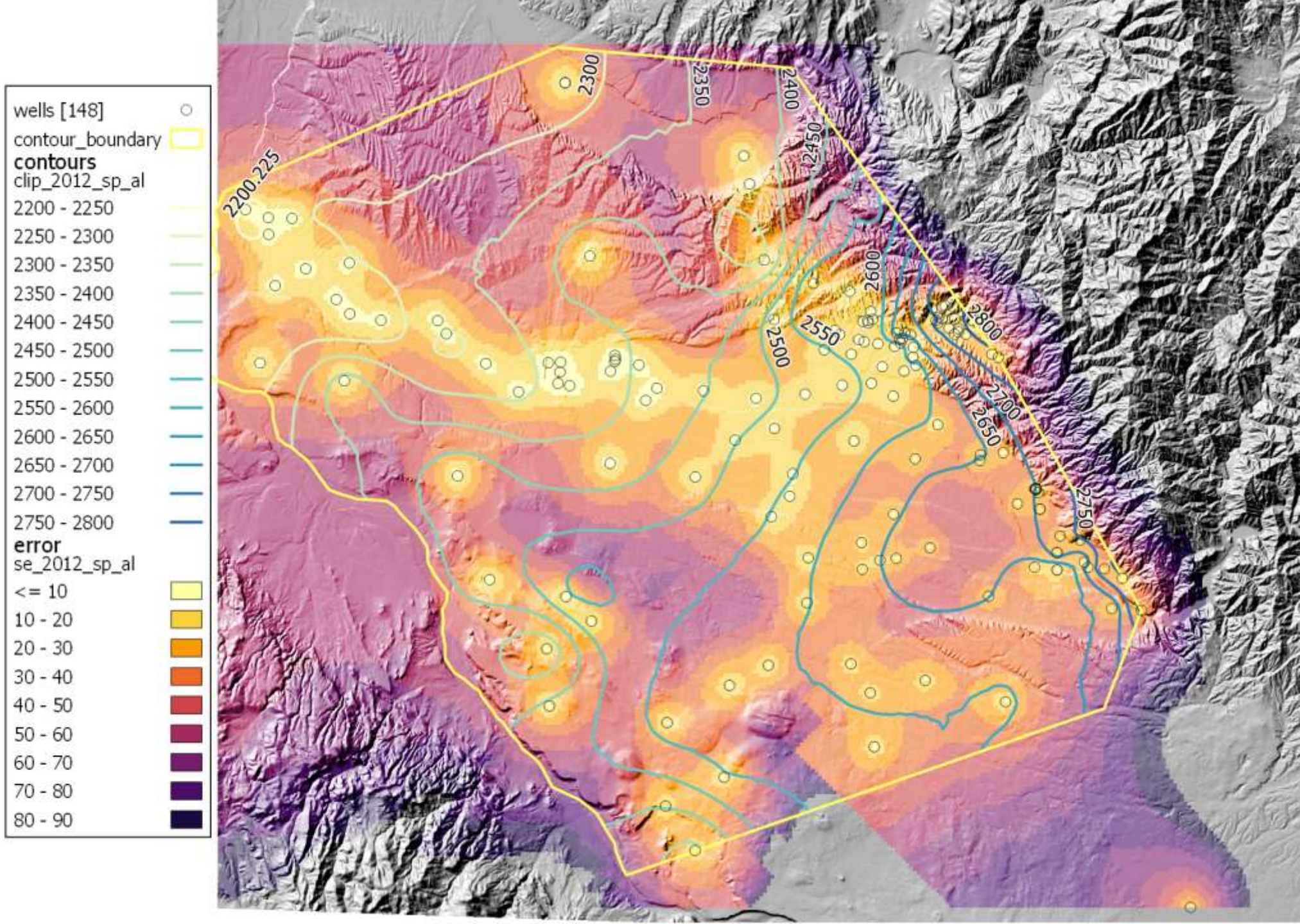
Low: Spring 2005



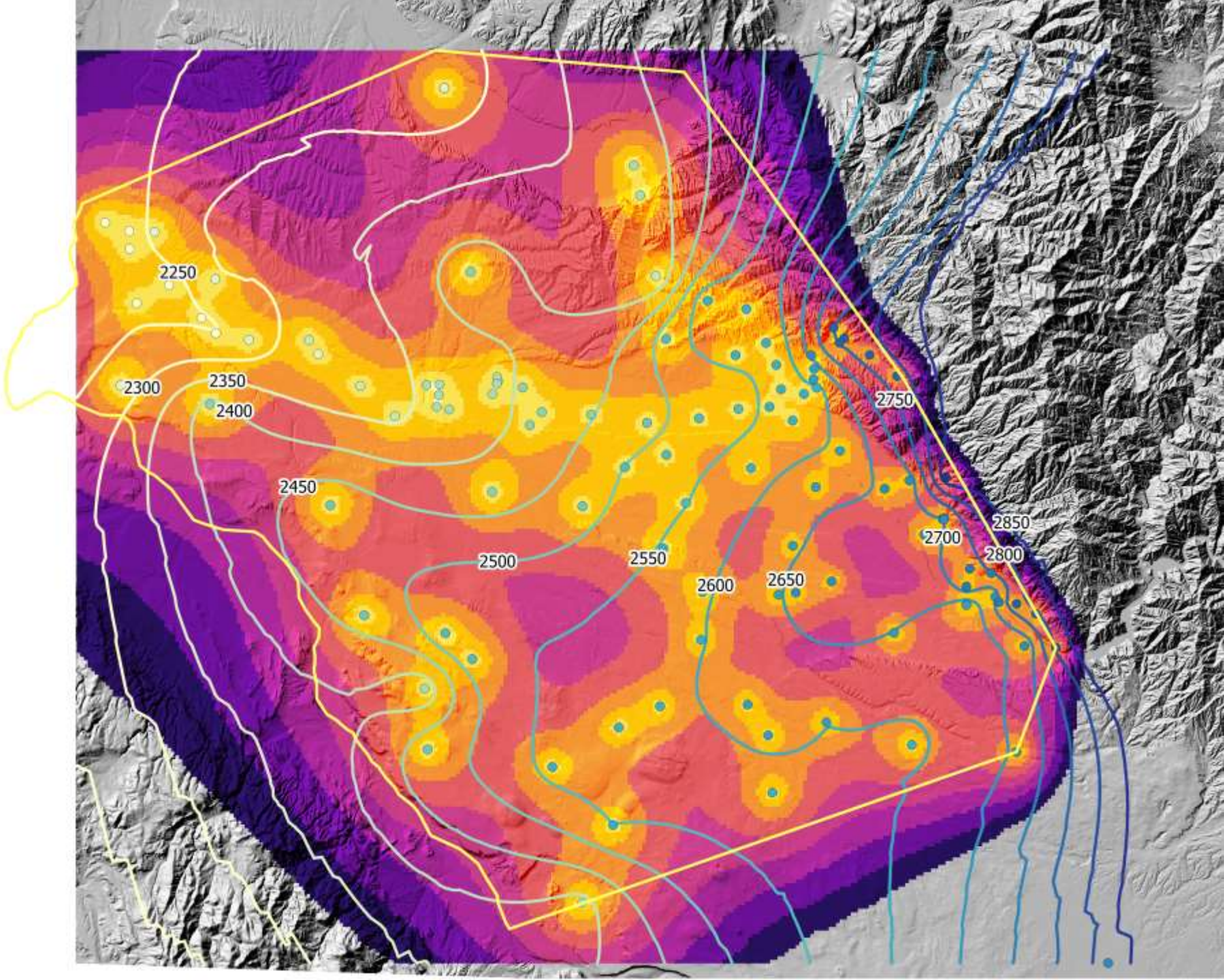
Mid: Fall 2001



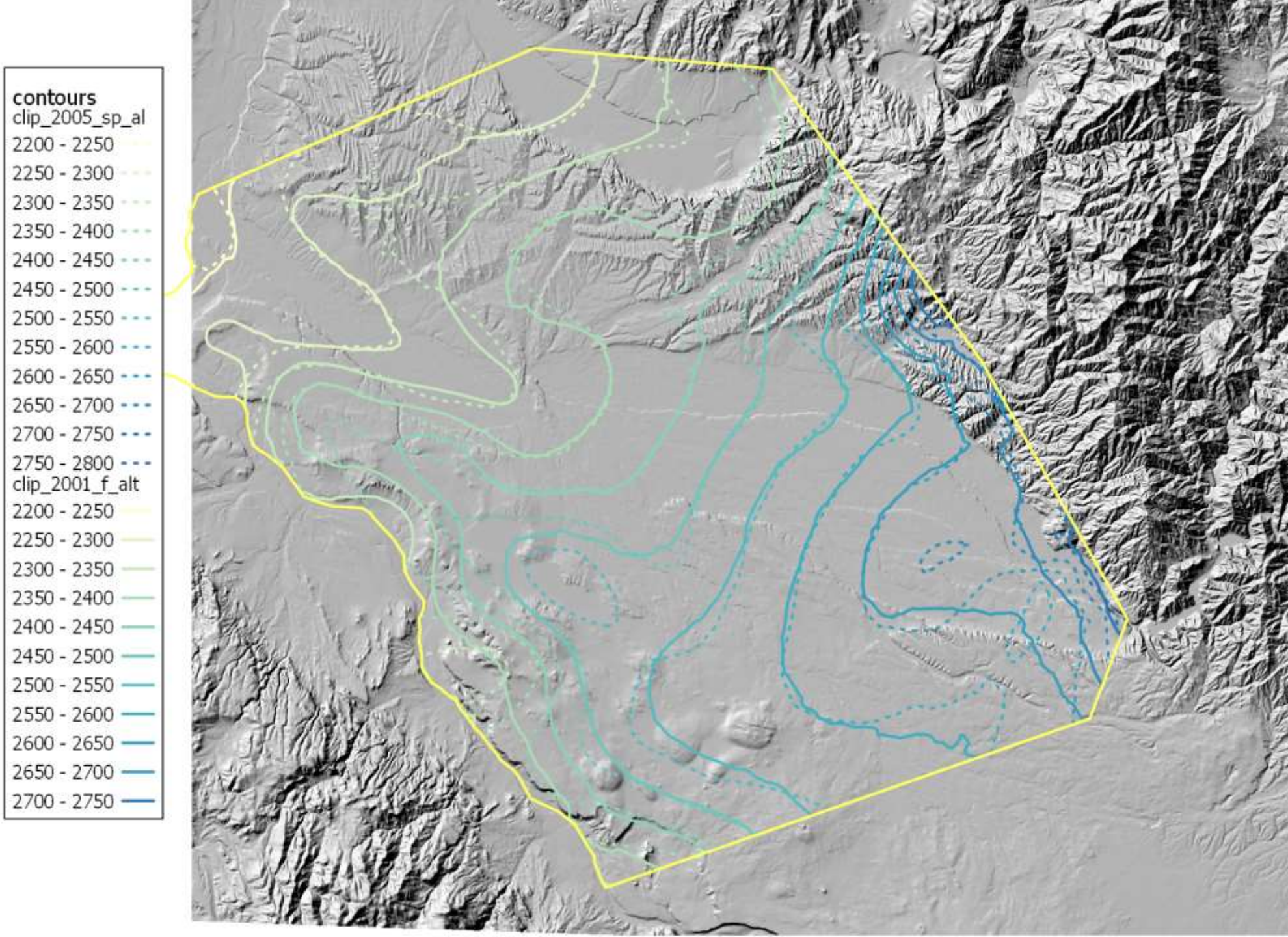
High: Spring 2012



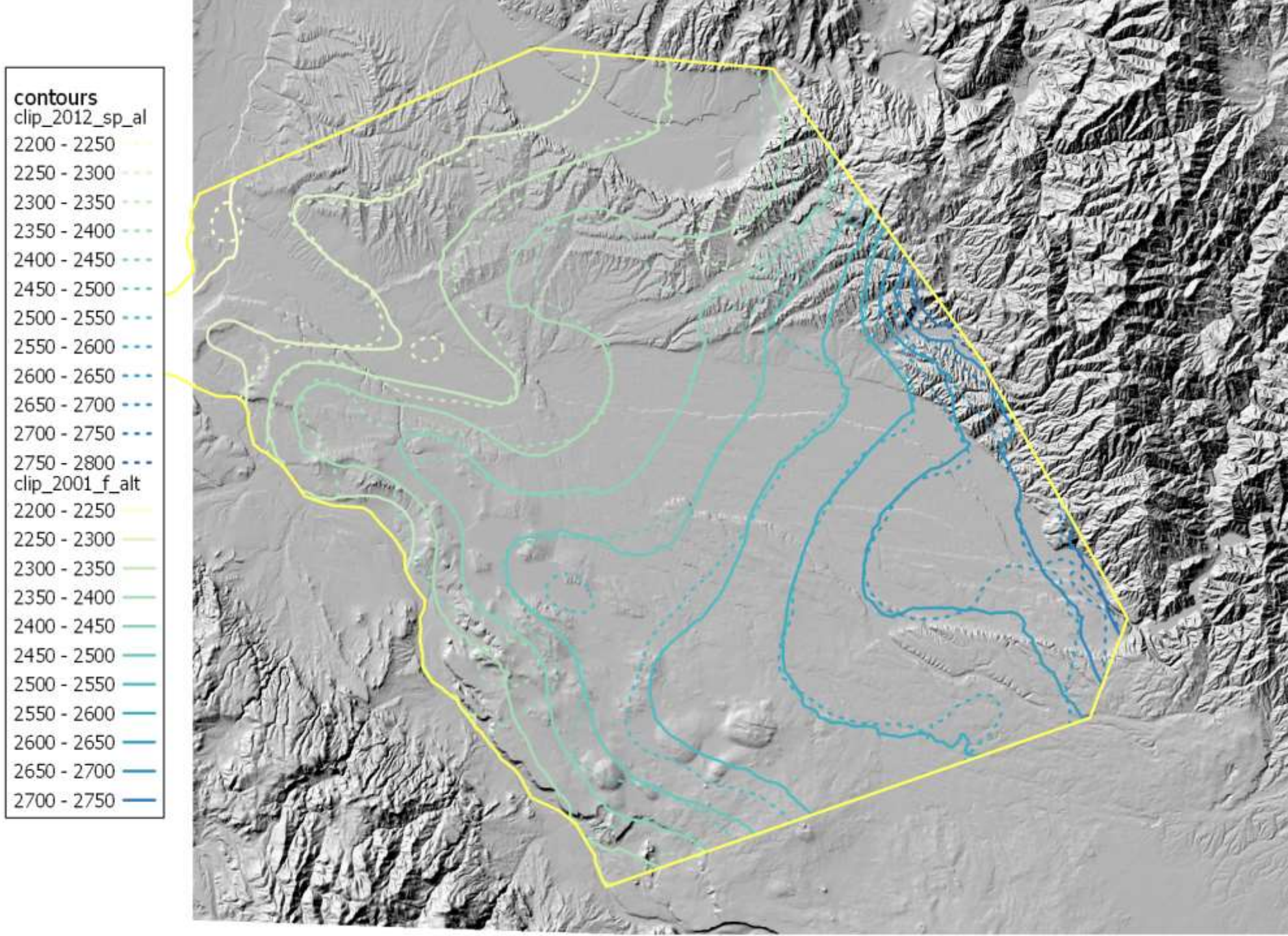
Spring 2017


2250
2300
2350
2400
2450
2500
2550
2600
2650
2700
2750
2800
2850

Middle vs Low



Middle vs High



Observations

- Flow is towards the Boise River north of the New York Canal and towards the Snake south of the New York Canal/Lake Lowell Area
- Water table fluctuations are generally minimal with exception of SW and SE Boise or Payette/Boise divide.
- Standard Error maps provide a sense of uncertainty in the prediction

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On the optimal selection of interpolation methods for groundwater contouring: An example of propagation of uncertainty regarding inter-aquifer exchange

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