

Late Pleistocene Shoreline Fluctuations of Lake Manix, Mojave Desert: Paleoclimate Implications

Marith C. Reheis, David M. Miller,
and John P. McGeehin



Regional setting of Lake Manix



Why study the Mojave?

- Presently occupies a transition zone between areas dominated by westerly Pacific winter moisture and southerly monsoon summer moisture
- Terrestrial climate proxies may record changing influence of these moisture sources



Jet stream

D-O cycles

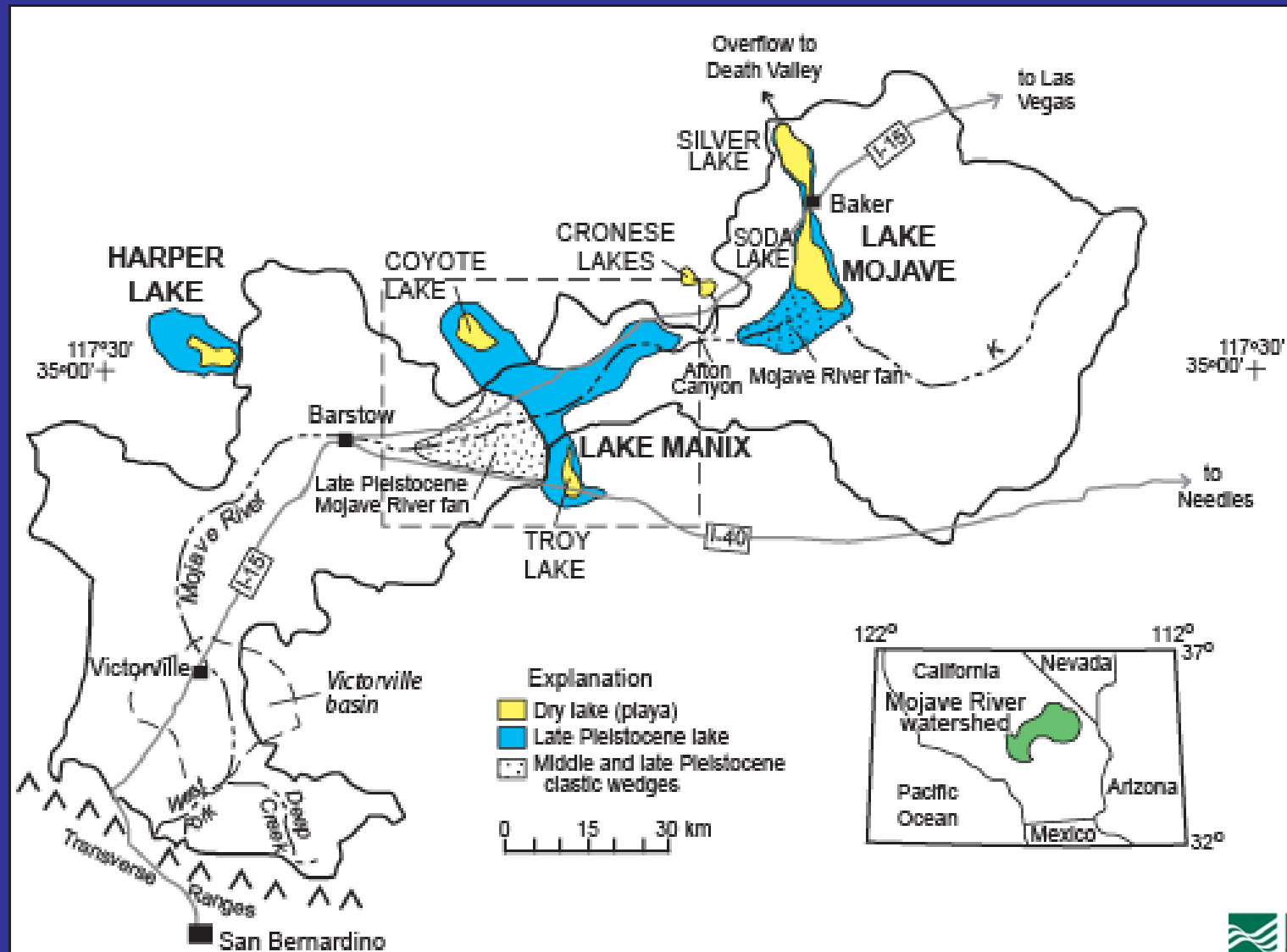
H events

PDO

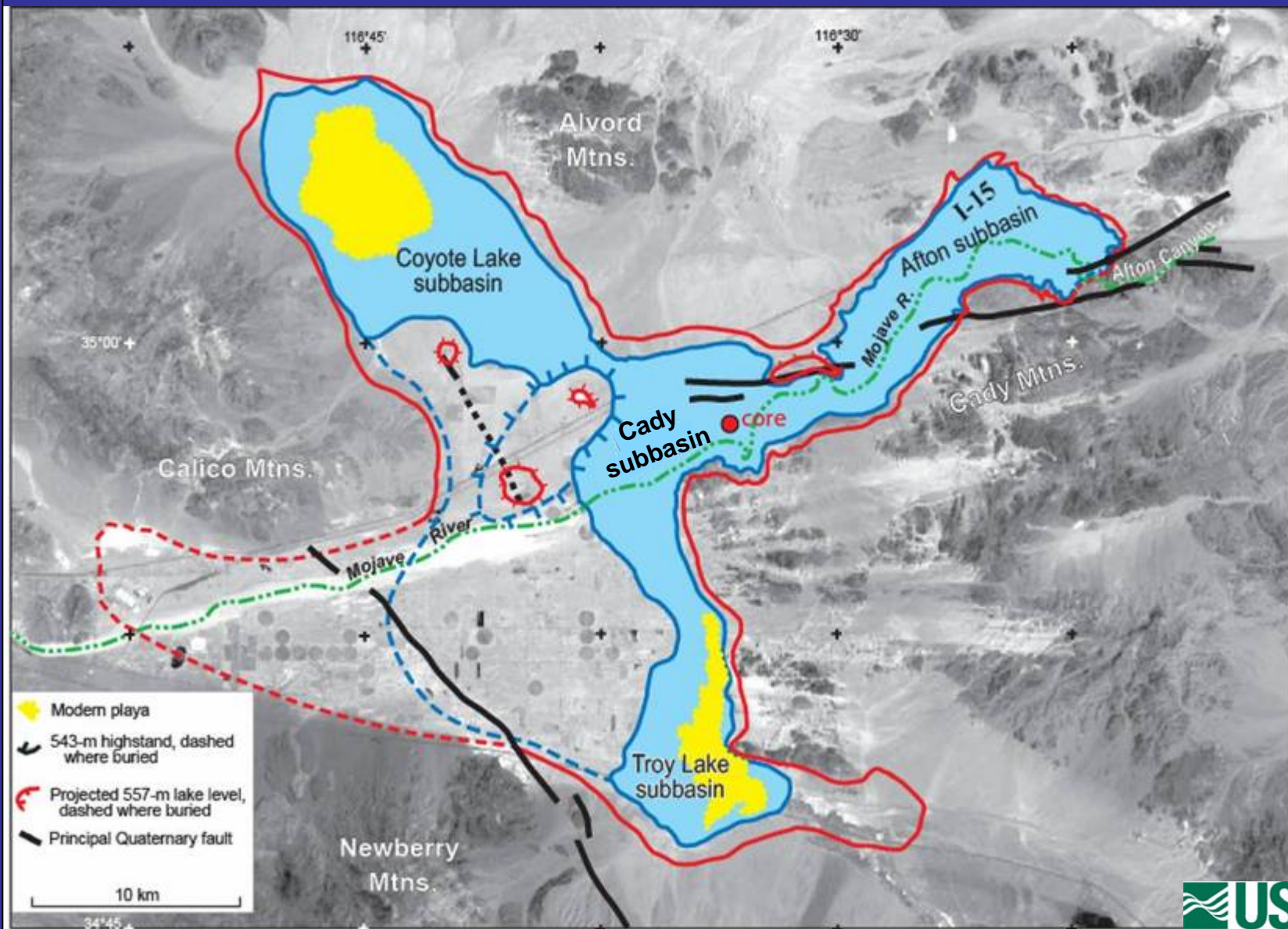
ENSO

NAM, PNA.....?

Mojave River fed Lake Manix between about 500 ka and 25 ka; occasionally, river diverted to Harper Lake

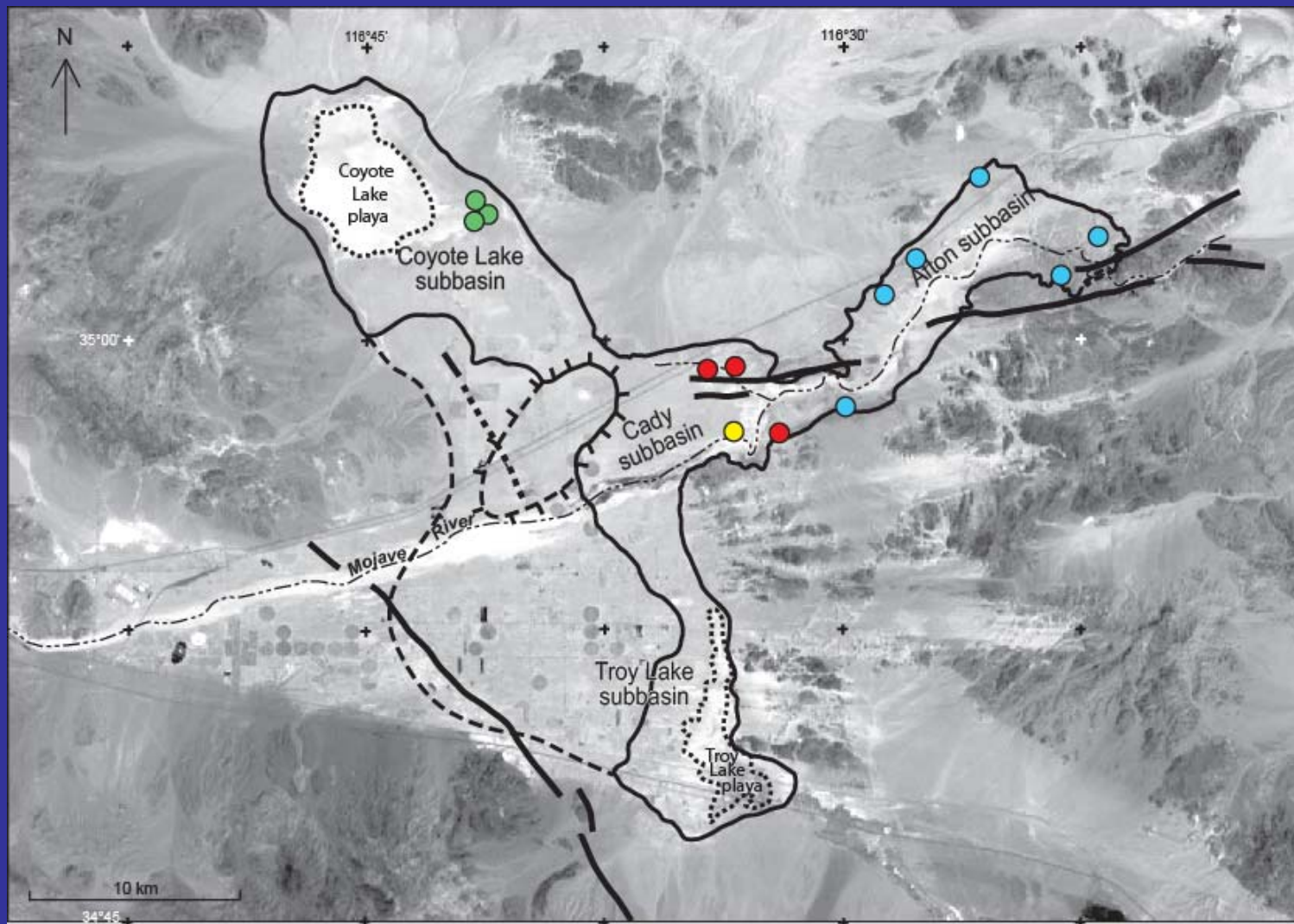


Late P highstands were ≤ 543 m (in blue), controlled by threshold near Afton Canyon and internal sill to Coyote Lake



^{14}C dating sites (*Anodonta* shells)

Each dot typically represents multiple dates / sites
Calibrated using Fairbanks et al. conversion



Late Quaternary lake phases

Lake 8 (MIS 3):
Mostly shallow-
water sand and
gravel preserved



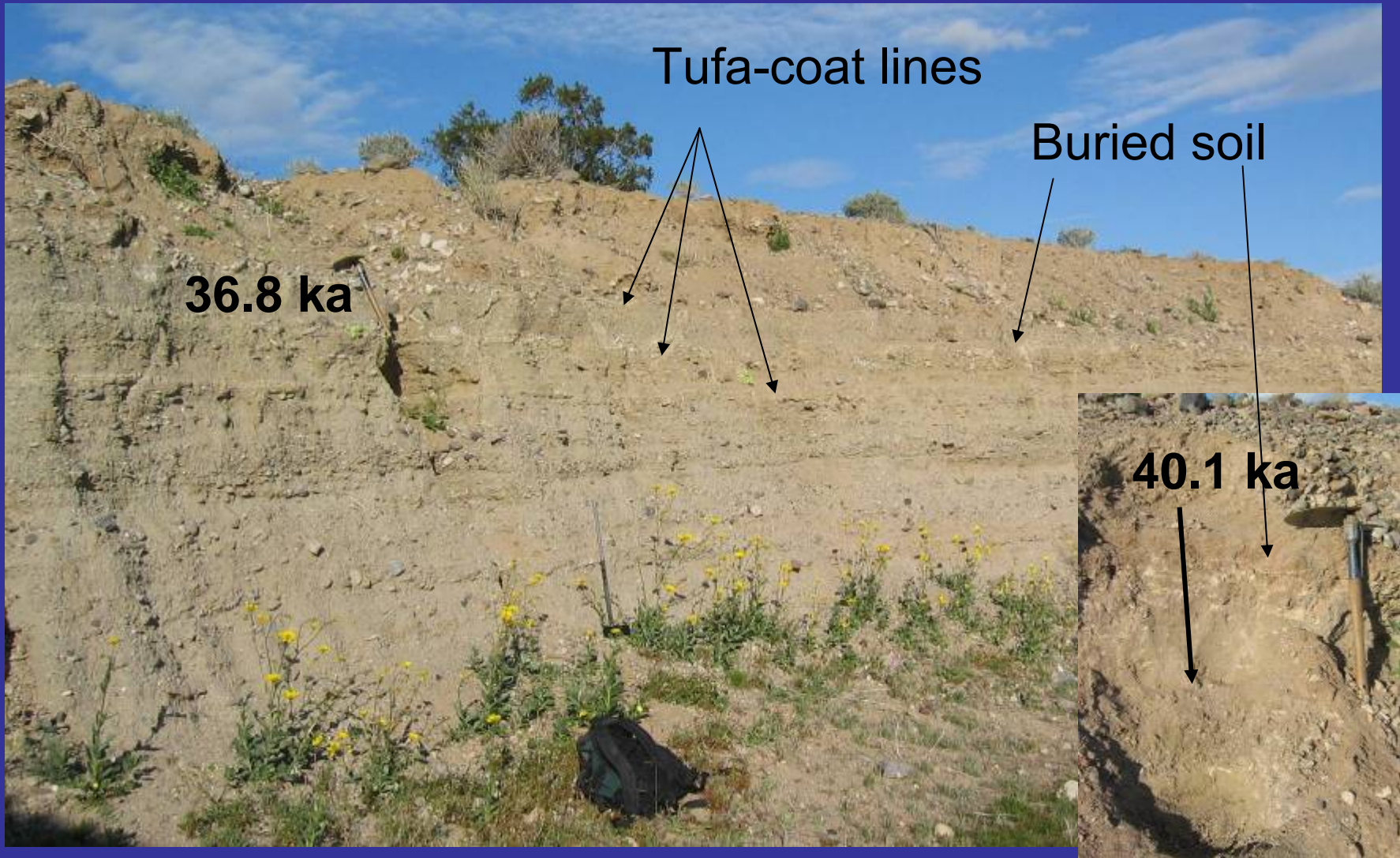
Lake 7 (MIS 6-4?):
Mostly deeper-water
green mud interbedded
with sand

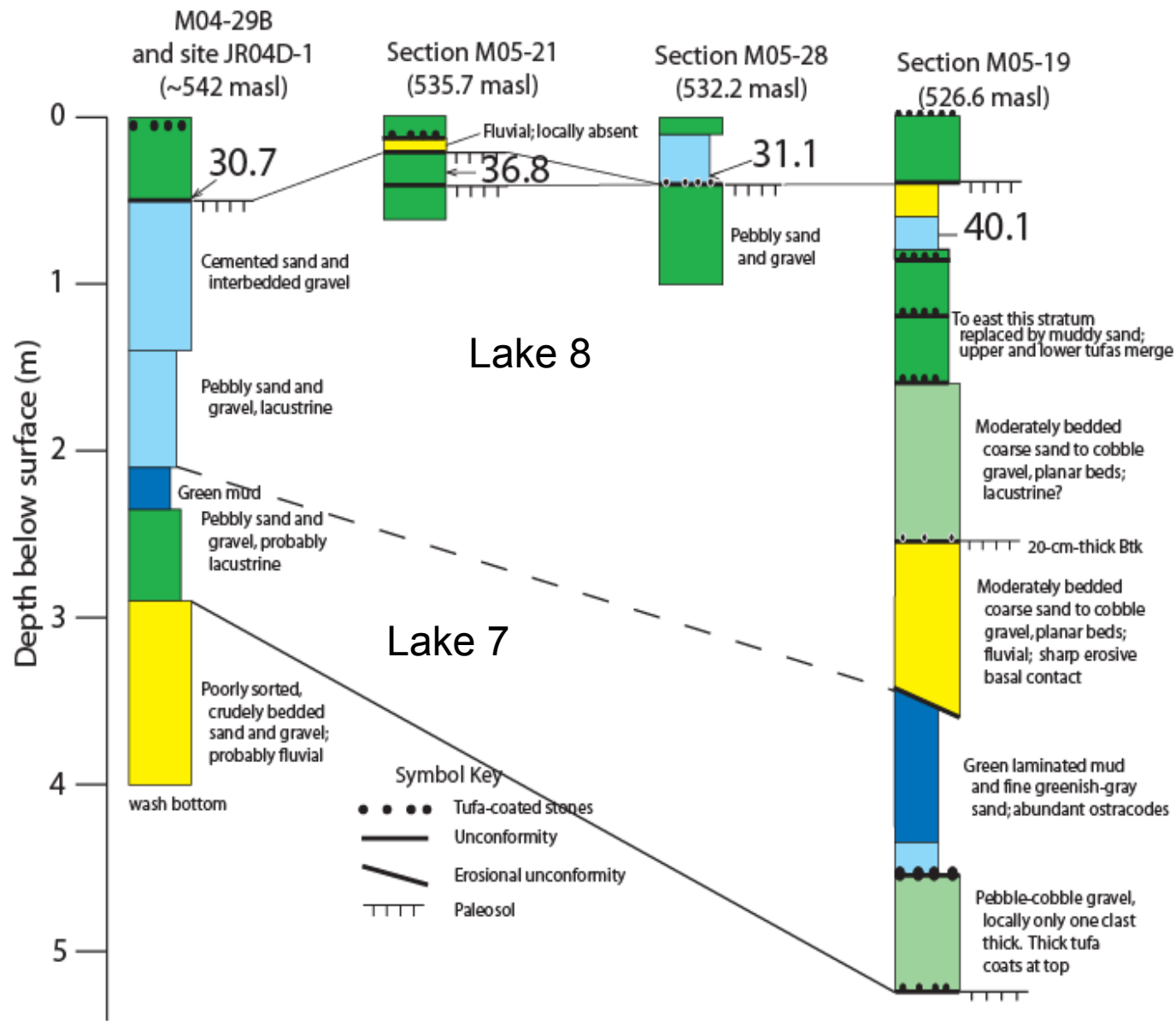




**Tufa-coated clasts commonly mark
lake transgressions
in gravelly sediment**

Upper Dunn Wash— fluvio-lacustrine deposits



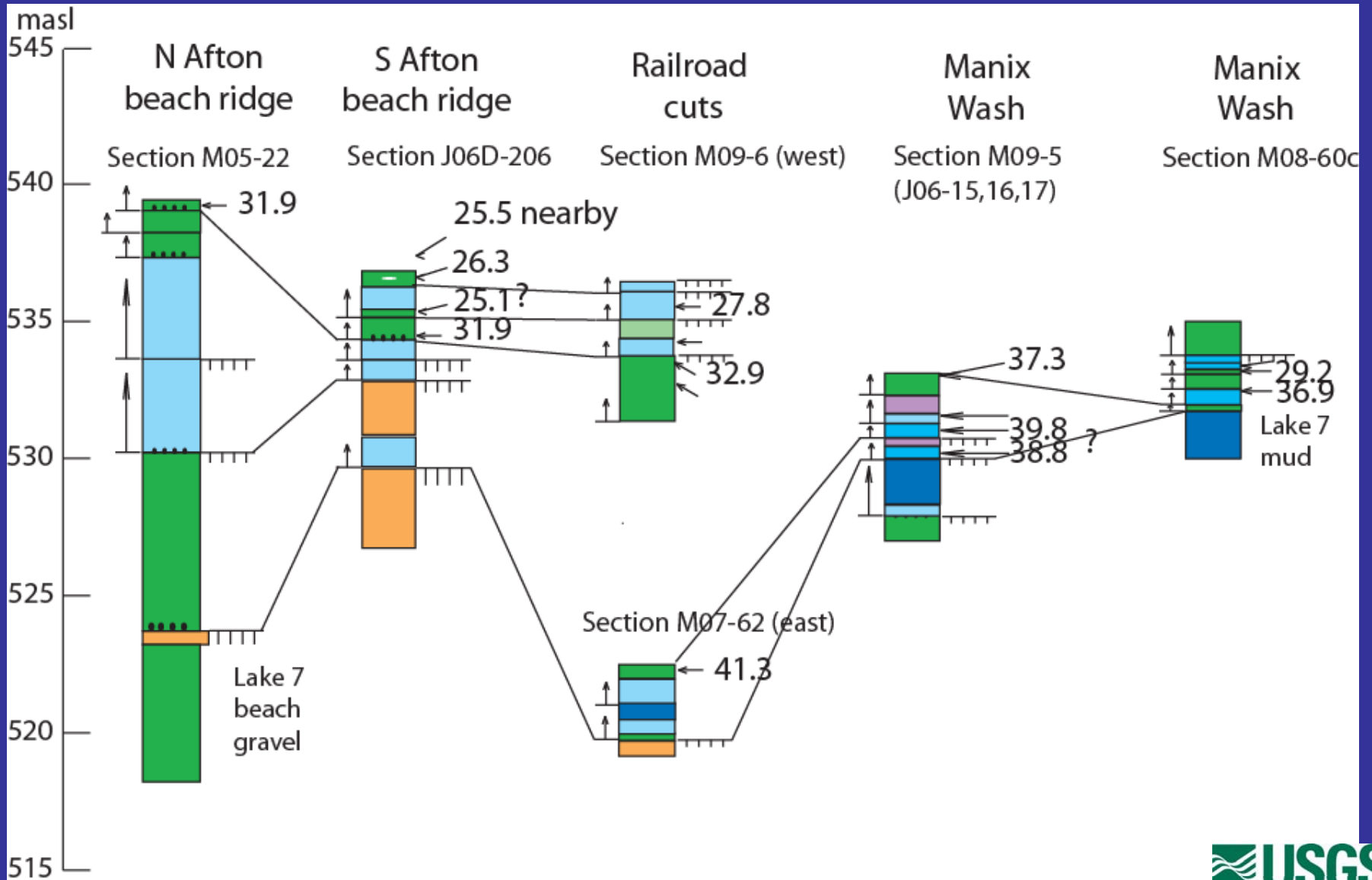


Upper Dunn Wash sections

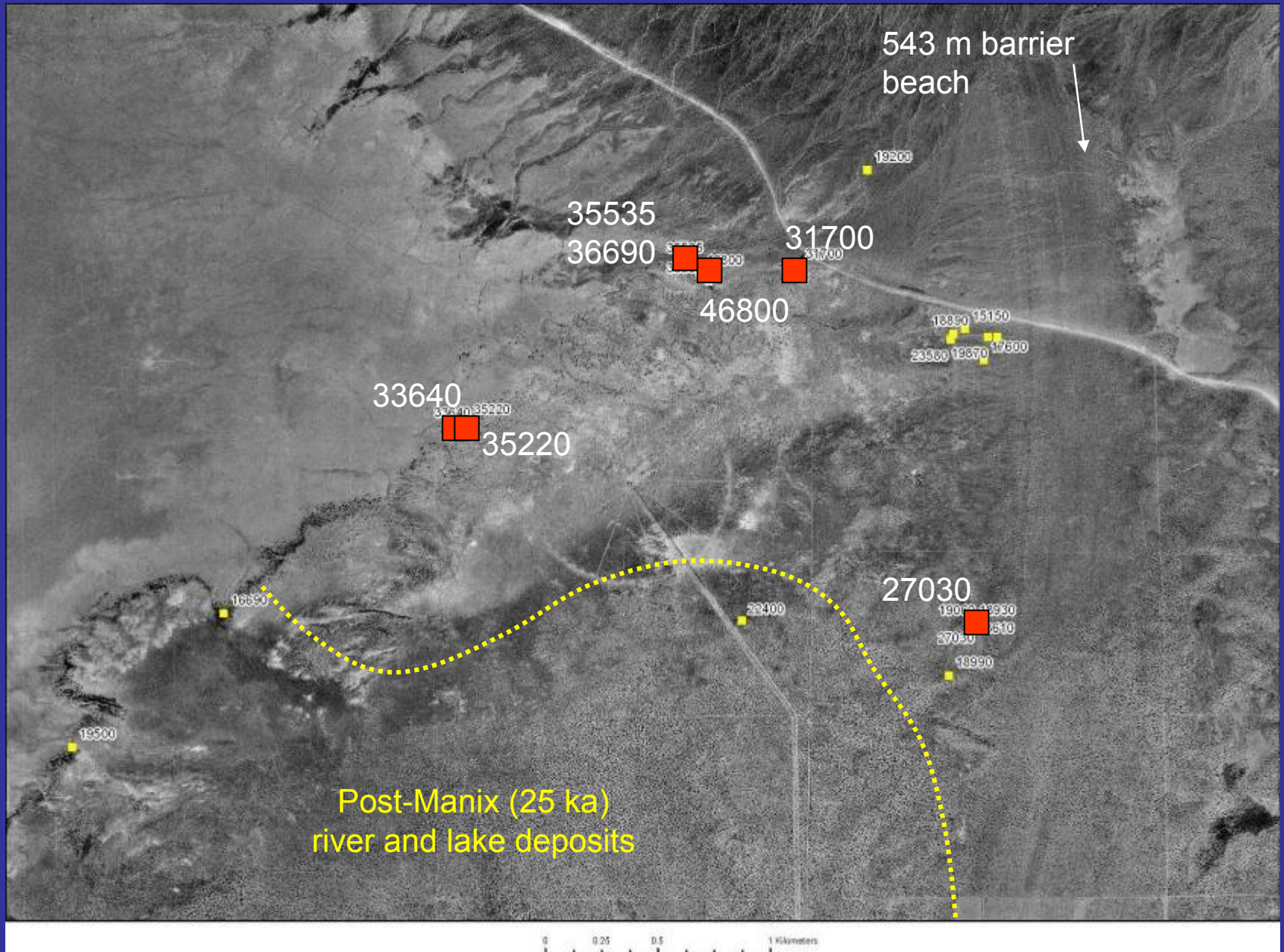
Other selected sections

east

west



Coyote Lake dating sites



SE Lake Coyote: stratigraphy & interpretation



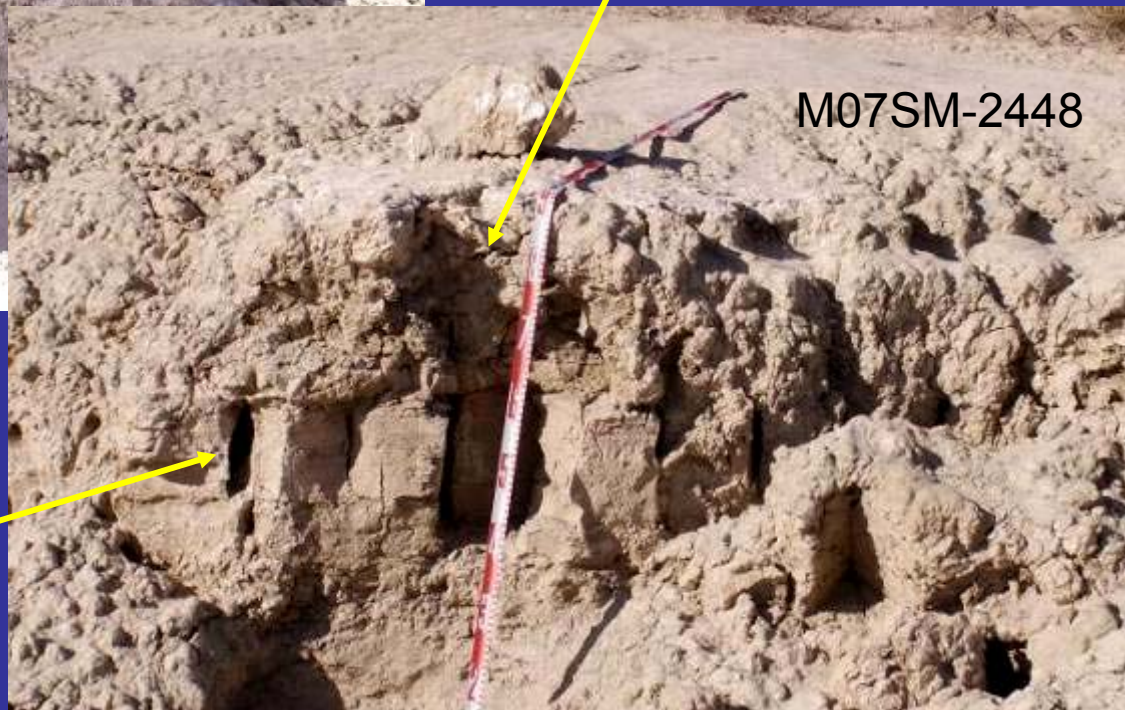
Many rapid fluctuations indicated by ostracode-hash "death beds"

Shell bed
36.7 cal ka

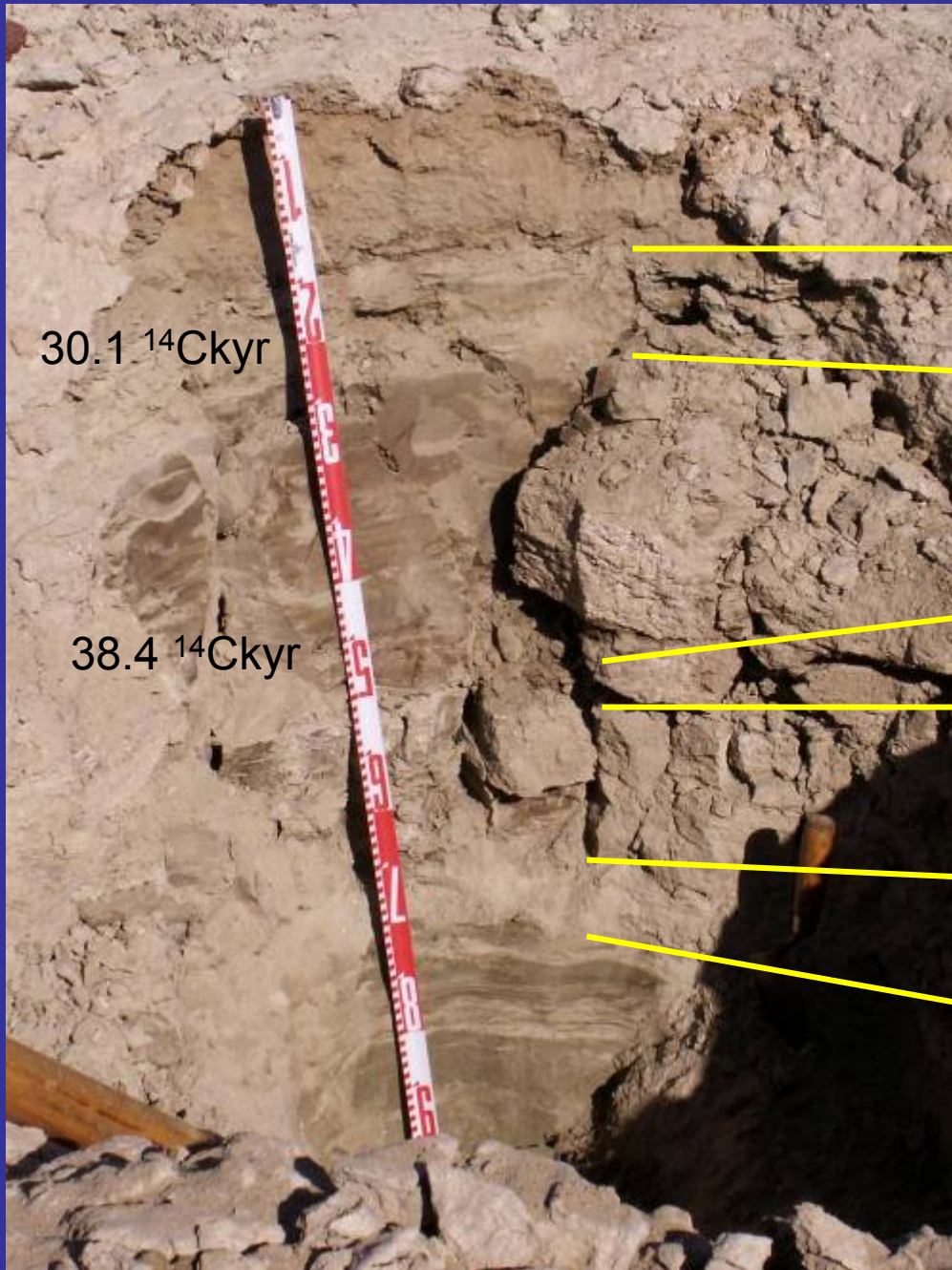


Shell bed
33.6 cal ka

Buried soil



M07SM-2448



30.1 $^{14}\text{Ckyr}$

38.4 $^{14}\text{Ckyr}$

vaguely laminated gypsic sand

fine and med sand, rippled with mud drapes in upper 4 cm

hard mud and vfi sand, ripple laminated

loose med sand, well sorted, laminated

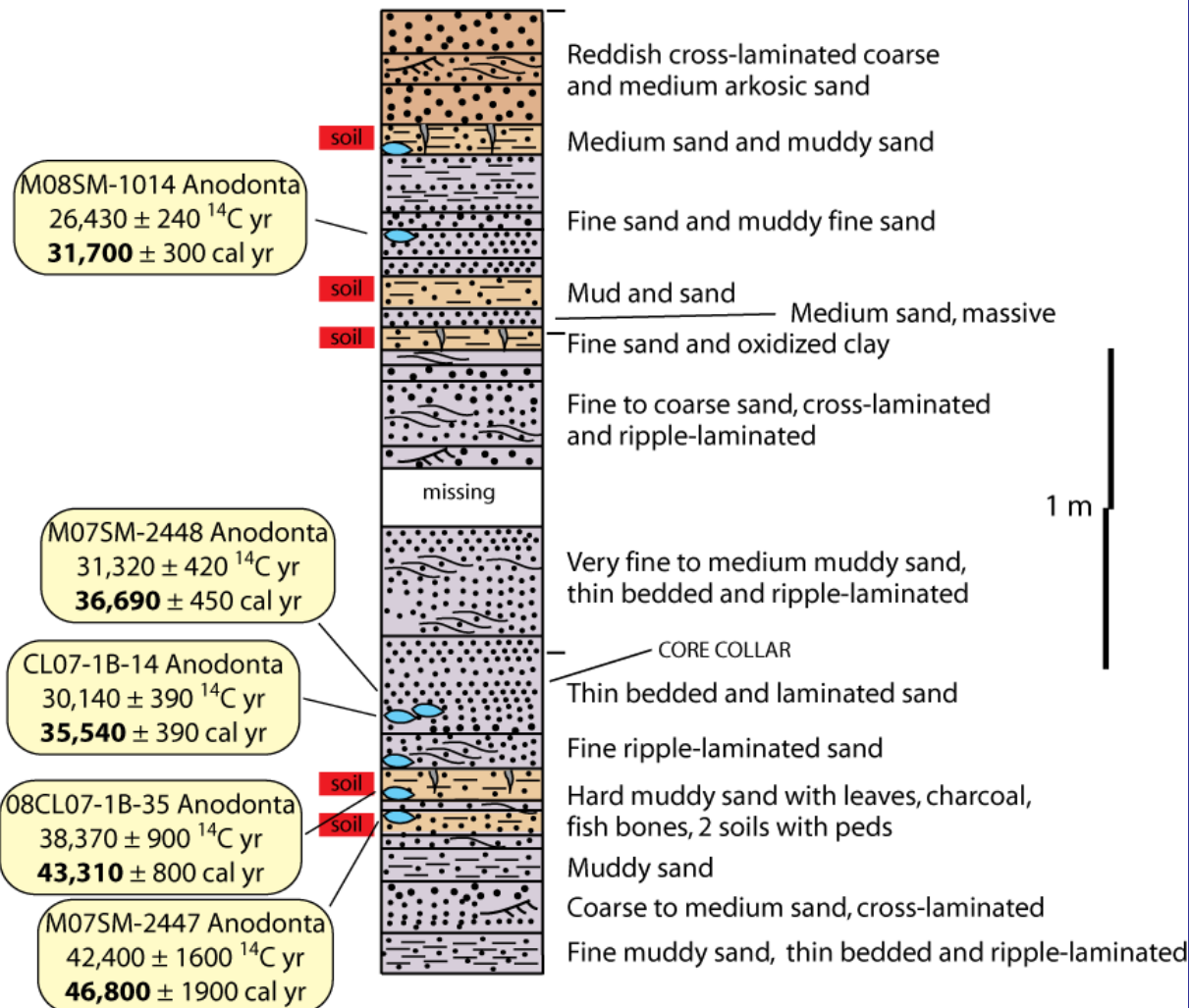
hard blocky mud; floating sand grains; one shell layer; one thin sand in middle. Soil?

loose medium sand, faintly laminated

mud with lenses and v. thin beds of sand, some rippled

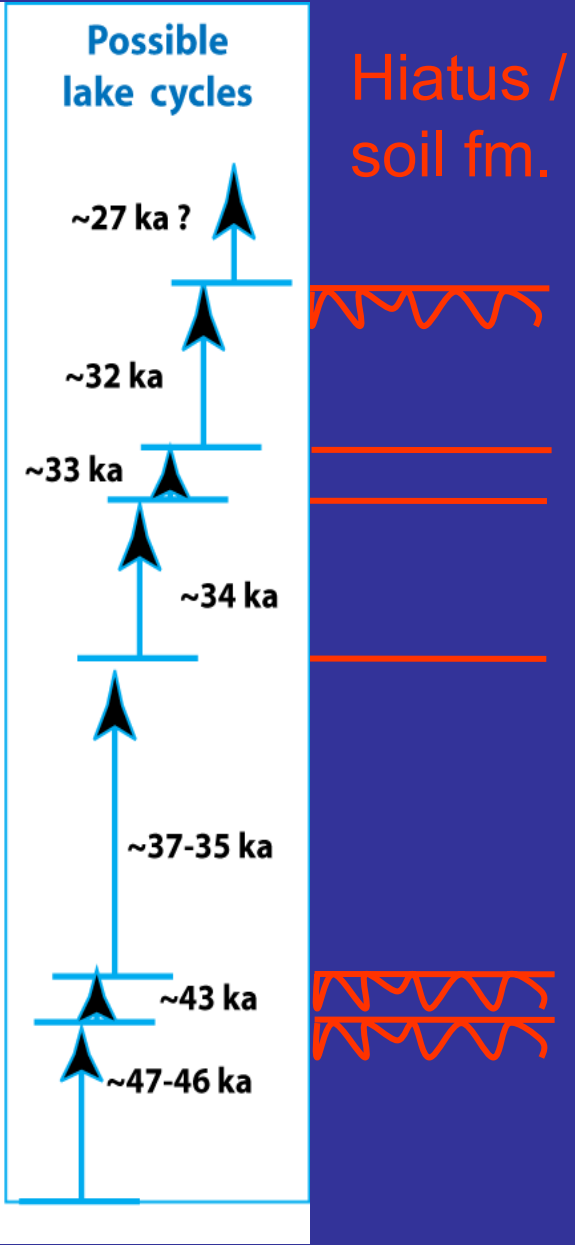
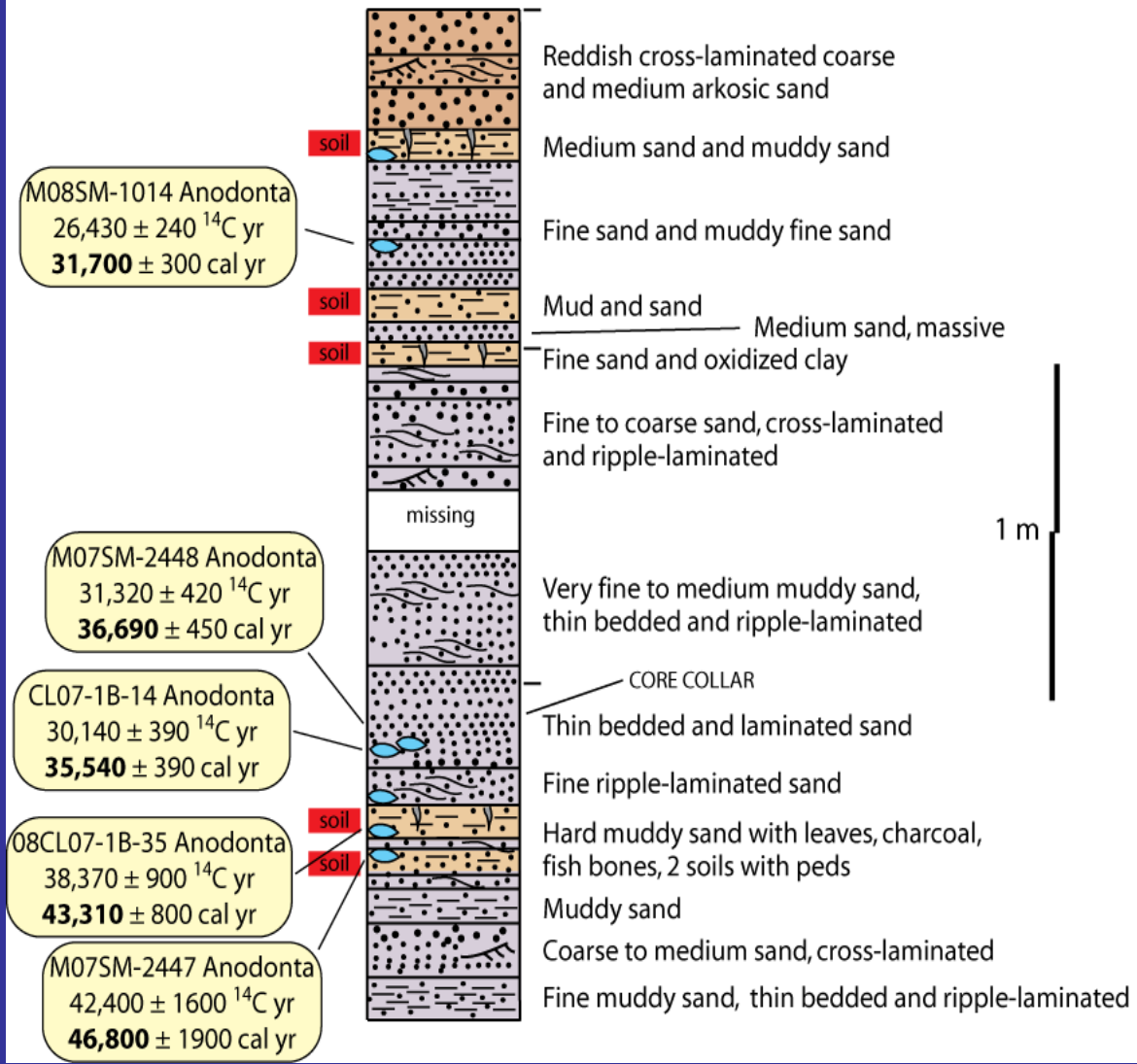
SE Coyote Lake—hand dug pit plus outcrop

Southeast Coyote Lake composite stratigraphy



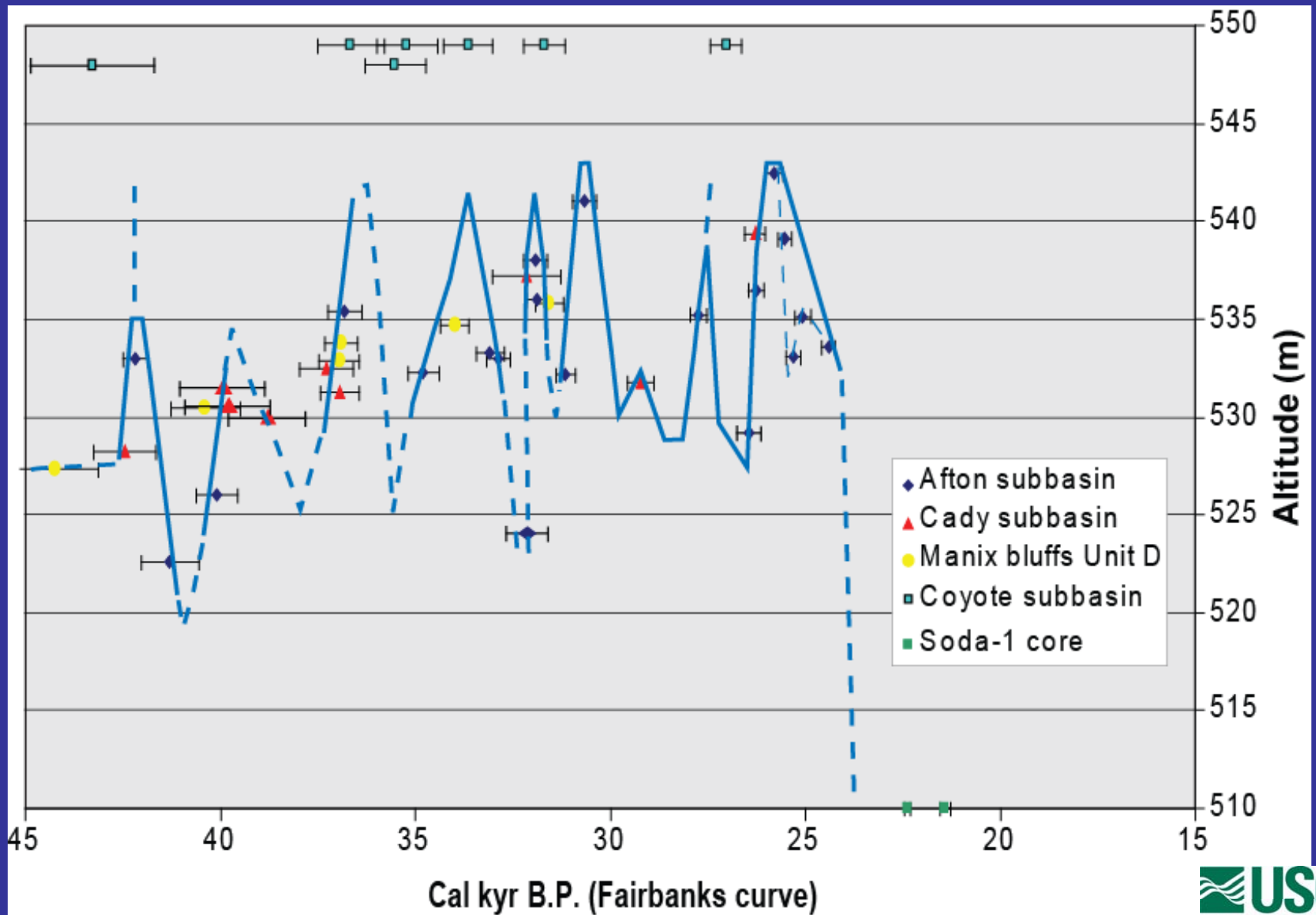
- Thin sedimentary packages
- Small-scale stratigraphy reveals complex record
- Three main lake phases separated by exposure and soil formation

Southeast Coyote Lake composite stratigraphy

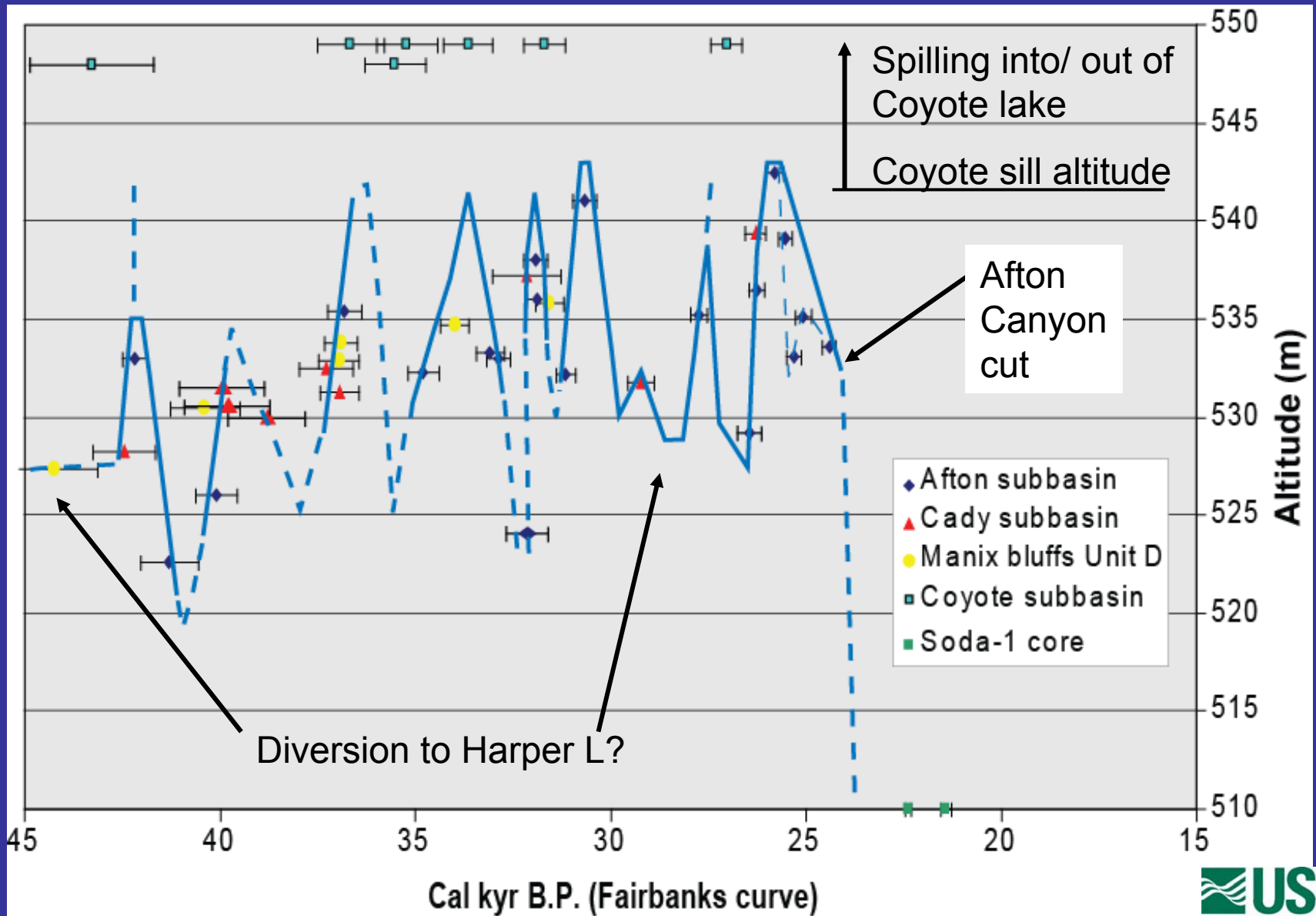


Hiatus / soil fm.

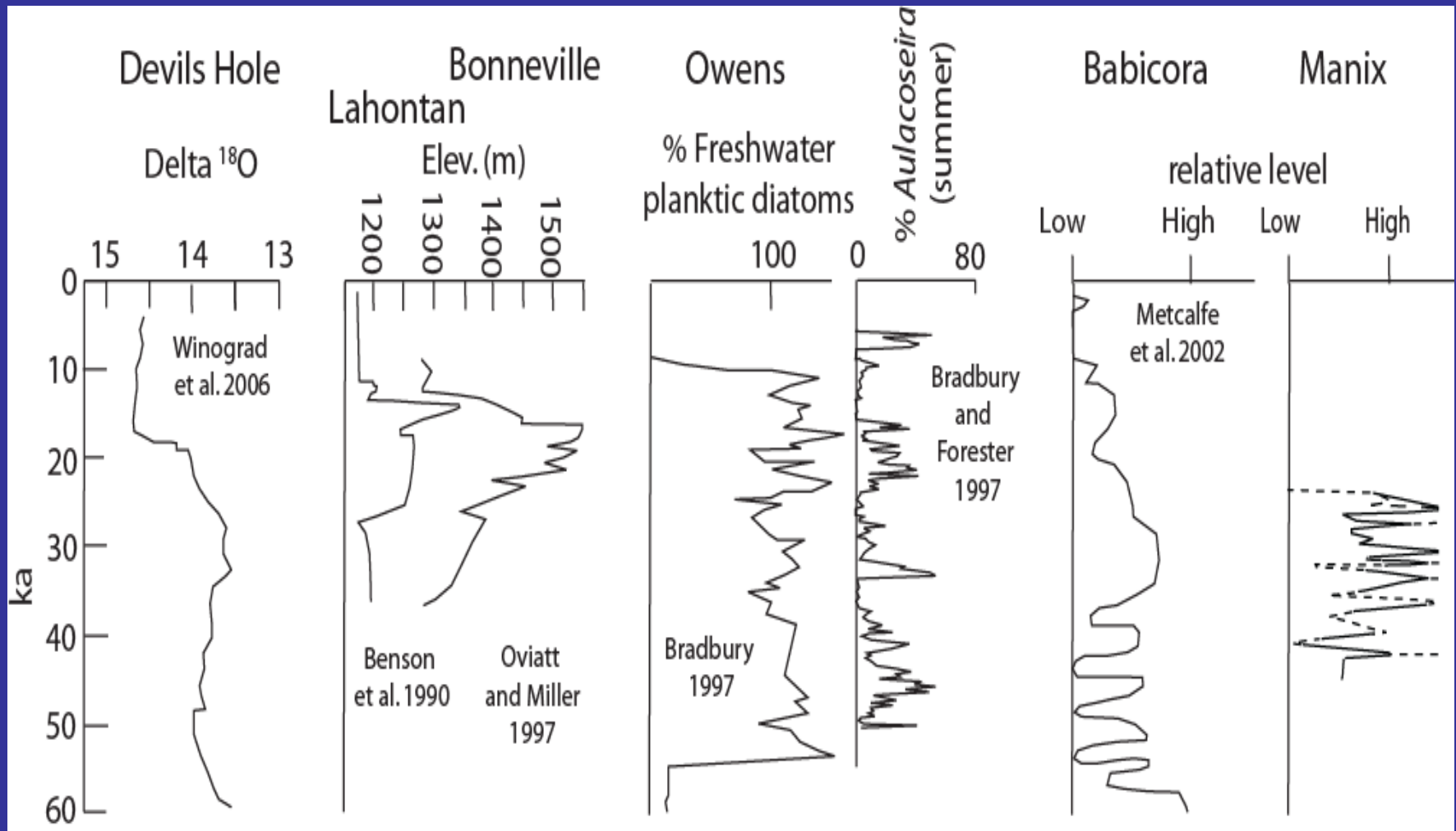
Provisional lake-level curve



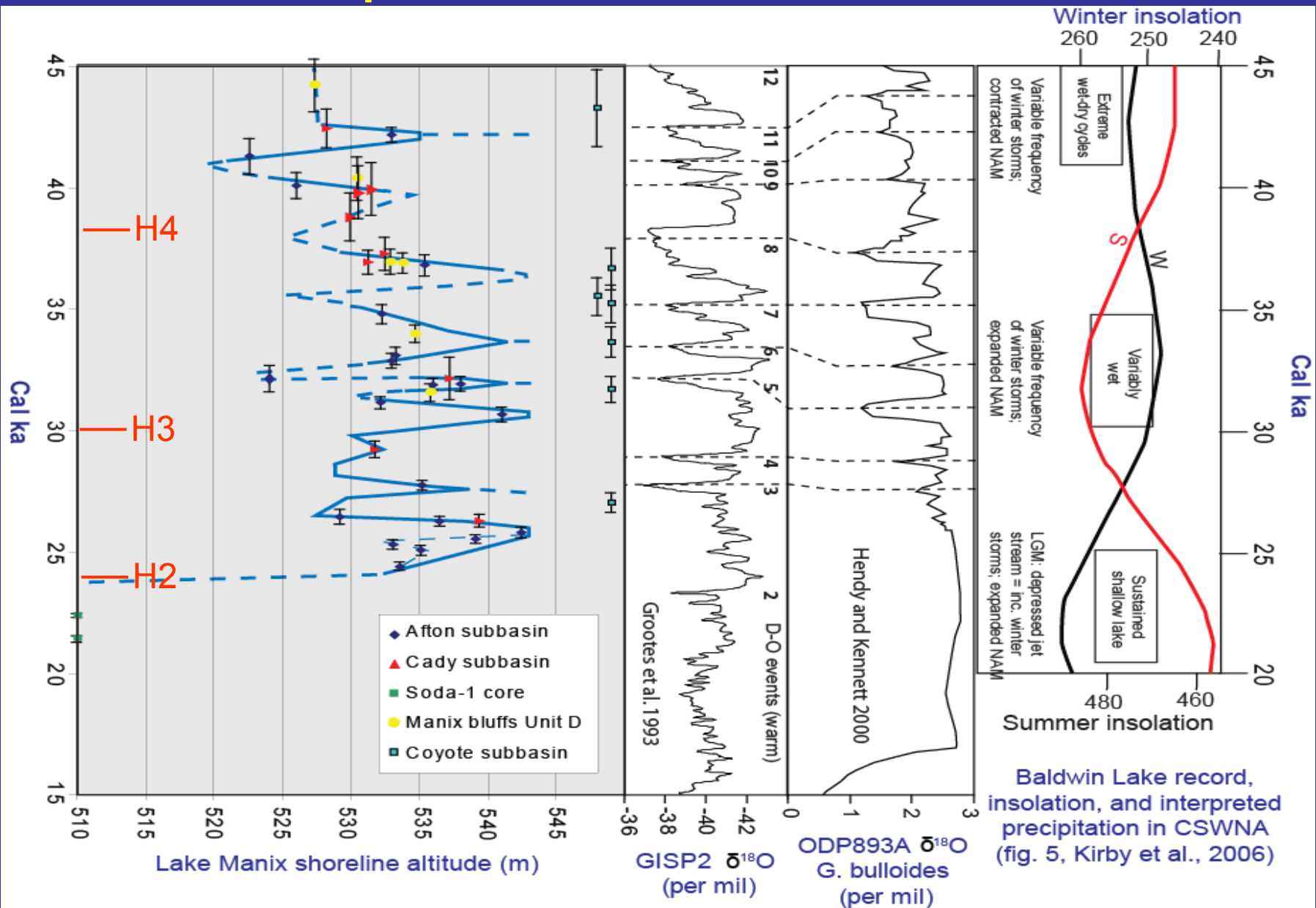
Other events affecting lake level



Comparison to other Great Basin lakes



Comparison to other records



Baldwin Lake record, insolation, and interpreted precipitation in CSWNA (fig. 5, Kirby et al., 2006)

Conclusions

- High-resolution MIS 3 record
- Lake Manix very sensitive to climate/runoff
- Broad features of record (but not all details) most similar to far southwest lakes: Babicora, Baldwin
- MIS-3 lake levels correspond to SOME events in marine / ice records:
 - Low levels during H4 and H3; H2 occurred during cutting of Afton Canyon
 - Some high levels match D-O (warm) events—but major highstands at ~30 and 25 ka do not

Helpful ideas will be appreciated!

