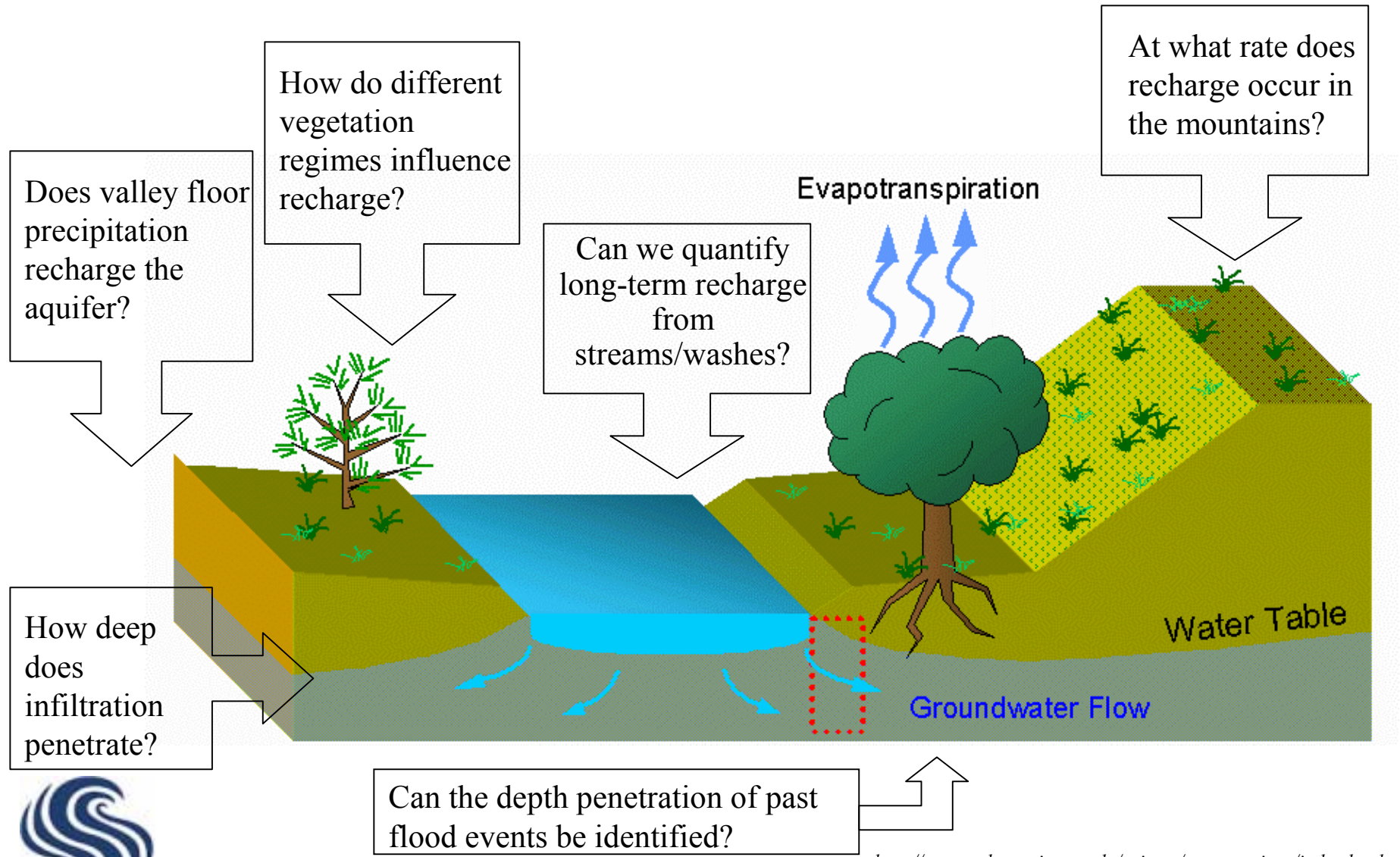


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# Recharge Questions

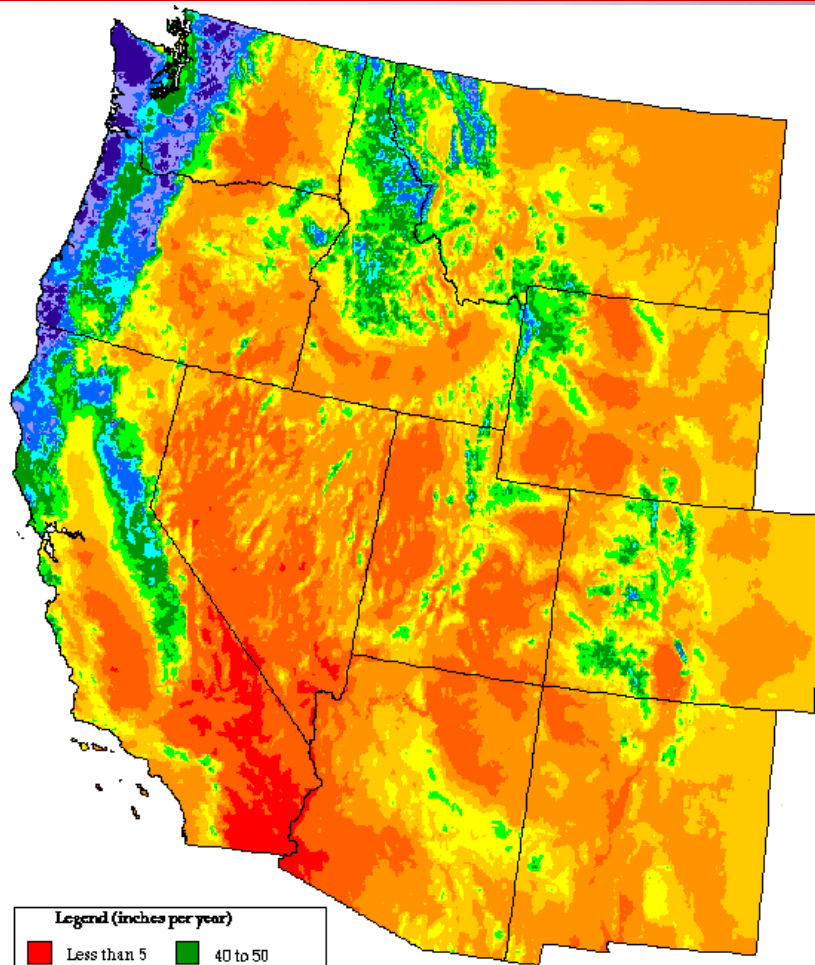


SAHRA

<http://www.sahra.arizona.edu/private/presentations/index.html>

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# Tracer deposition poorly known in Southwest



Legend (inches per year)

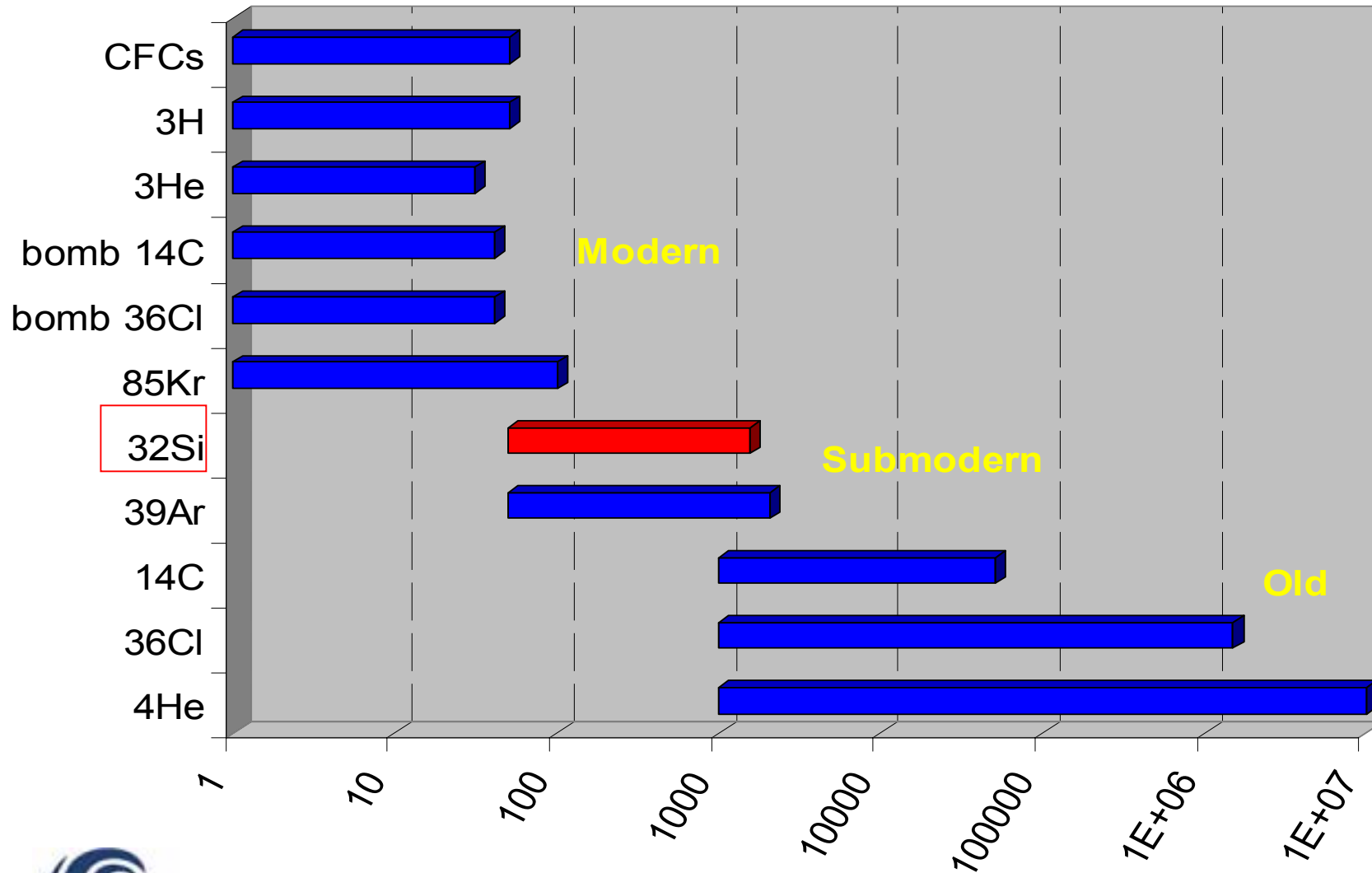
Less than 5	40 to 50
5 to 10	50 to 60
10 to 15	60 to 80
15 to 20	80 to 100
20 to 30	More than 100
30 to 40	

Average Annual Precipitation  
Western United States  
Period: 1961-1990 Units: inches

Propose to set up a network to sample atmospheric deposition of tracers (e.g.  $^{18}\text{O}$ ,  $^2\text{H}$ ,  $^3\text{H}$ ,  $\text{Cl}^-$ ,  $^{36}\text{Cl}$ ,  $\text{Br}^-$ , and  $^{32}\text{Si}$ ).

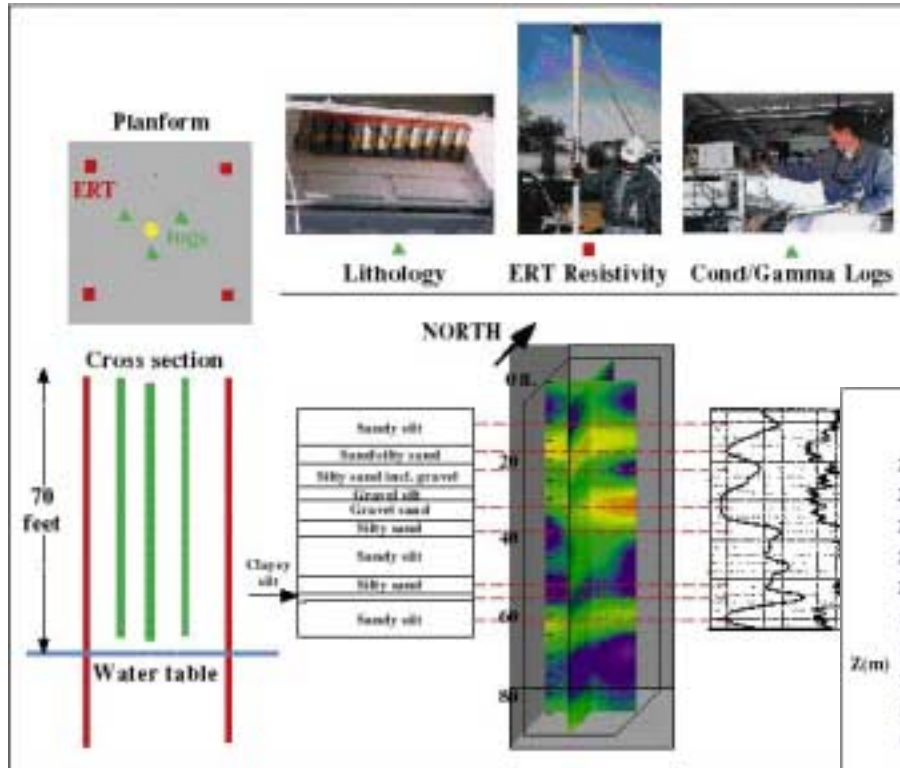


# Recharge can be studied over many time scales

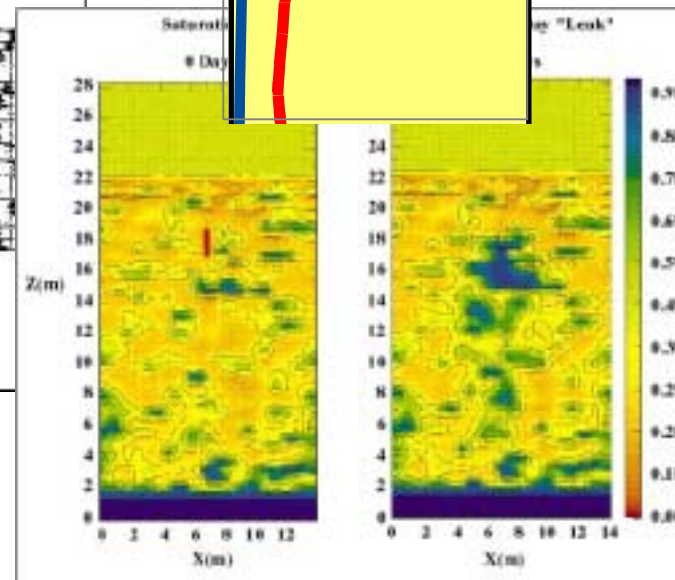
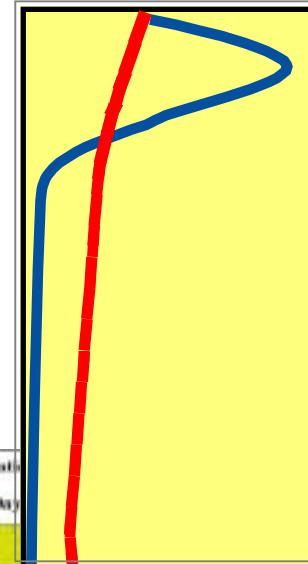


# Vadose Zone

## Geophysics, Geochemistry, and Models



<http://www.llnl.gov/ees/esd/sstrans/Carrigan/Vadose/>



<http://www.llnl.gov/ees/esd/sstrans/Carrigan/Vadose/>



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# *$^{32}\text{Si}$ : A New Method for Estimating Semi-arid Vadose Zone Recharge*

Sharon Einloth  
Brenda Ekwurzel  
Devendra Lal  
Austin Long  
Chris Eastoe  
Fred Phillips

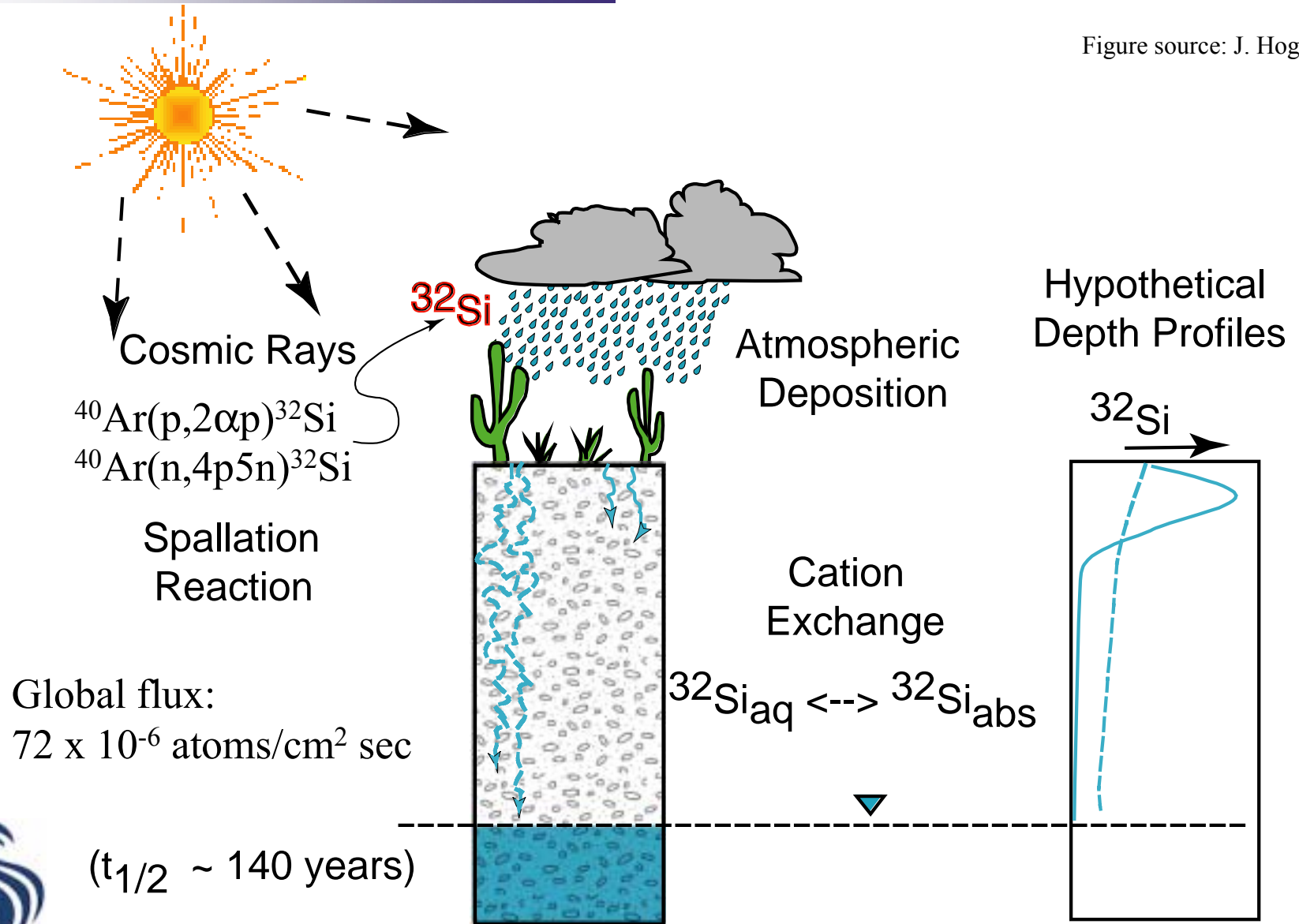
SCRIPPS  
INSTITUTION OF  
OCEANOGRAPHY



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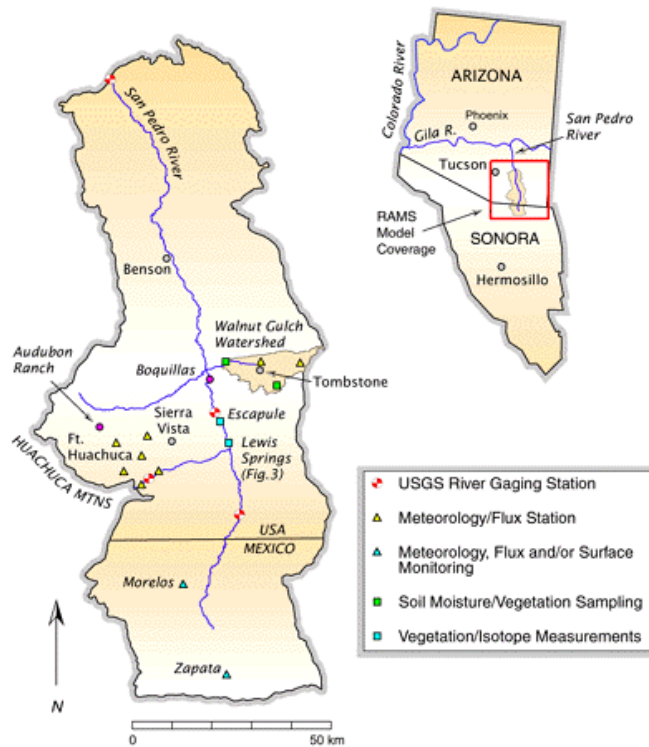
*Sustainability of semiArid Hydrology and Riparian Areas*

Figure source: J. Hogan

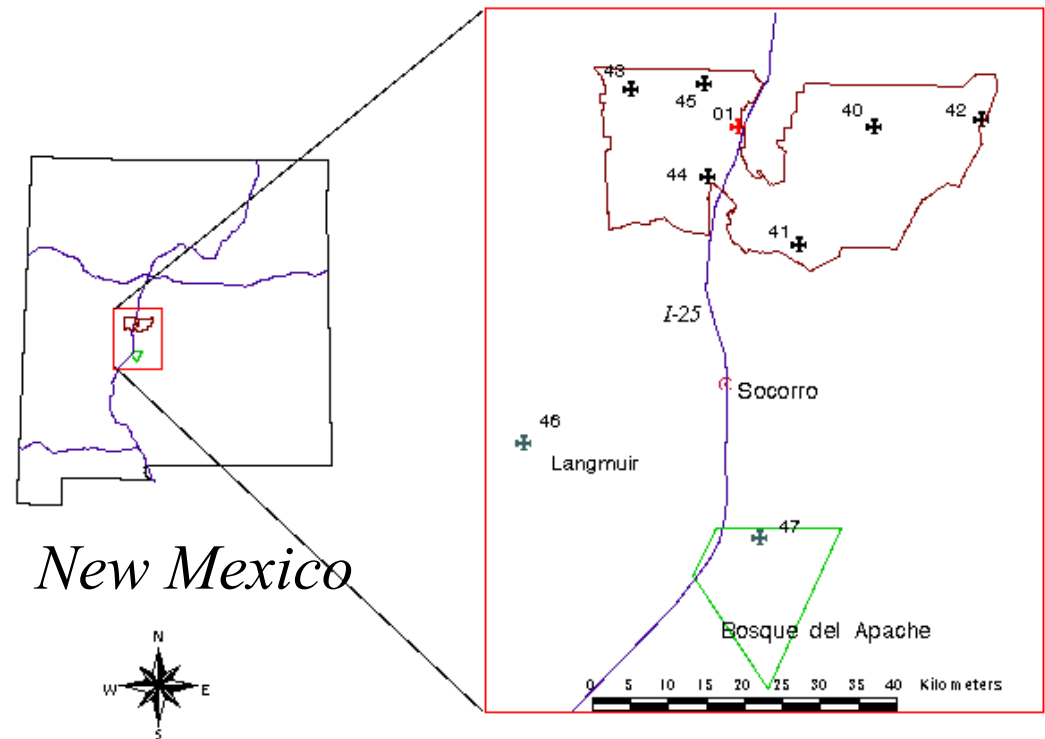


# Study Regions: A way to integrate

*“The whole is greater than the sum of the parts”  
(NSF goal)*



Sevilleta NWR and Satellite Meteorological Stations



*Upper San Pedro Basin*

<http://sevilleta.unm.edu/places/refuge/maps/satmet.gif>



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[http://www.tucson.ars.ag.gov/salsa/research/research\\_1997/mexico\\_research/posters/use\\_of\\_oxygen18/use\\_of\\_oxygen18.html](http://www.tucson.ars.ag.gov/salsa/research/research_1997/mexico_research/posters/use_of_oxygen18/use_of_oxygen18.html)

*Sustainability of semiArid Hydrology and Riparian Areas*

# *Location, Location, Location...*

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*Sustainability of semiArid Hydrology and Riparian Areas*

# *Atmospheric tracer deposition*

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*Sustainability of semiArid Hydrology and Riparian Areas*

# *Recharge through time*

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*Sustainability of semiArid Hydrology and Riparian Areas*

# *Vadose zone recharge processes*

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# *Basin-scale salt balances*

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# *What data are needed for the models?*

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