

# Airborne Electromagnetics in the Marina Area



Marina Coast Water District  
Ian Gottschalk and Rosemary Knight, Stanford University  
Aqua Geo Frameworks, Mitchell, NE

**Stanford** | SCHOOL OF EARTH, ENERGY  
& ENVIRONMENTAL SCIENCES

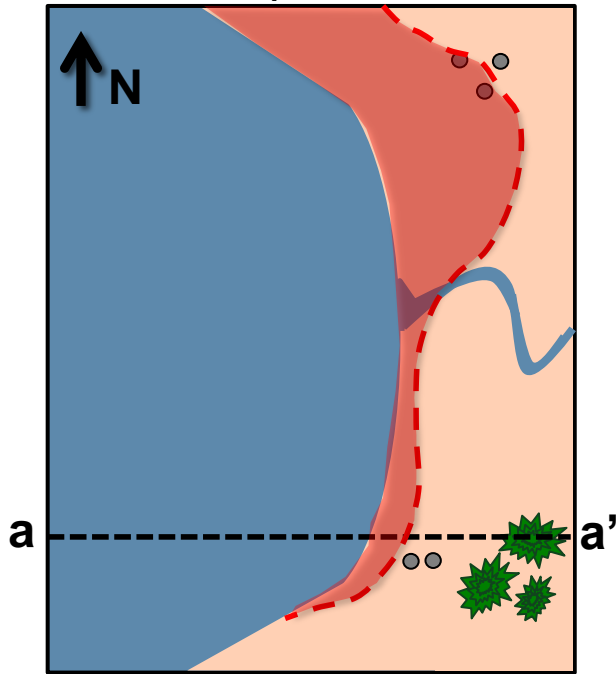




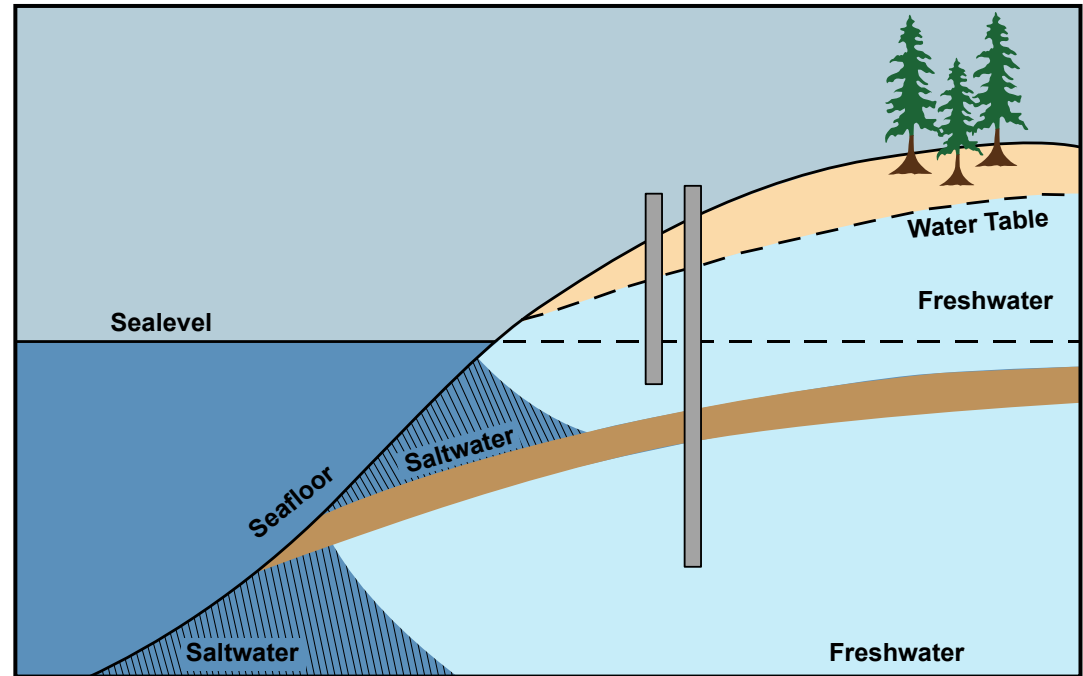
SkyTEM

# Saltwater Intrusion

map view

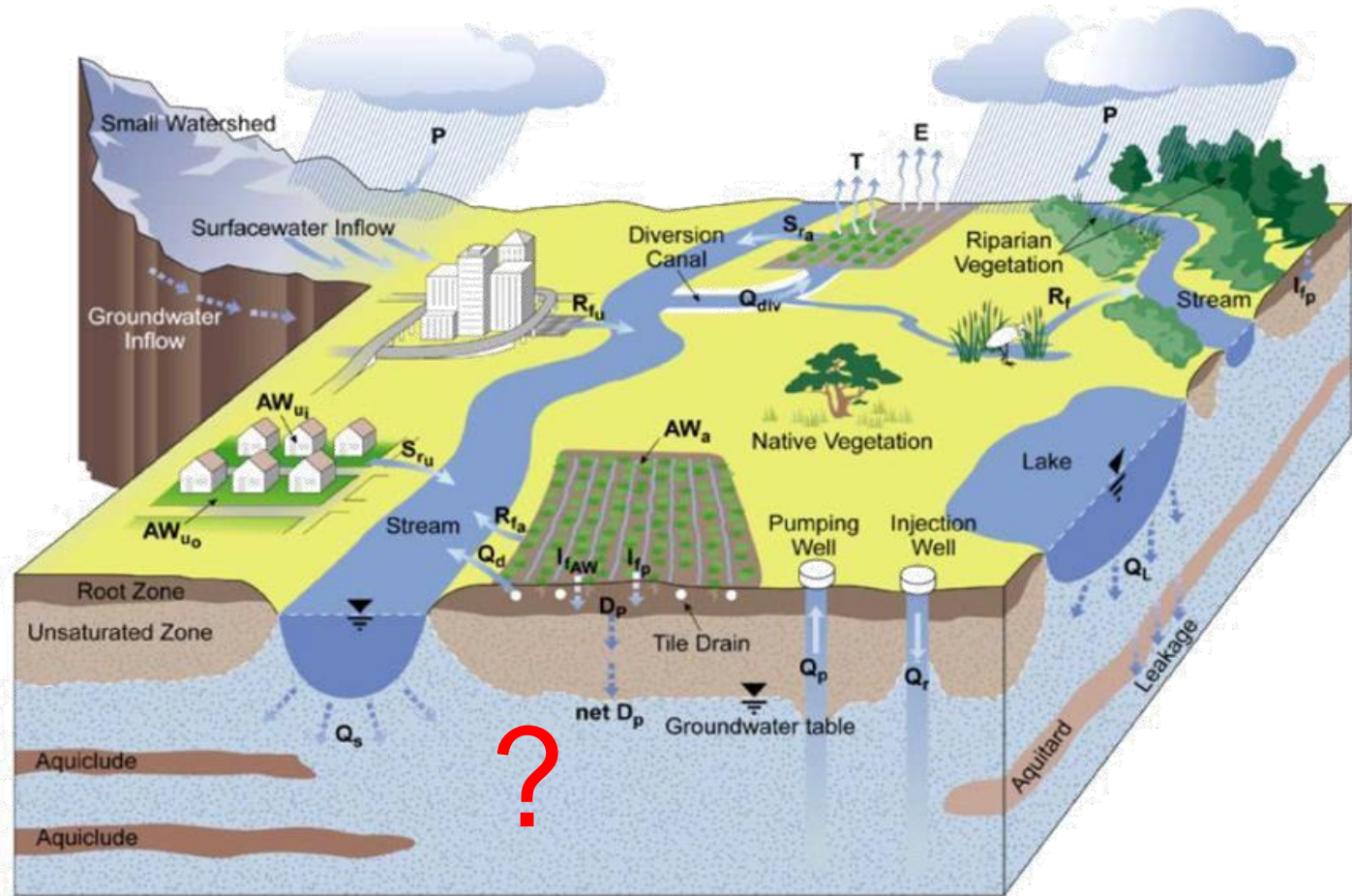


cross section

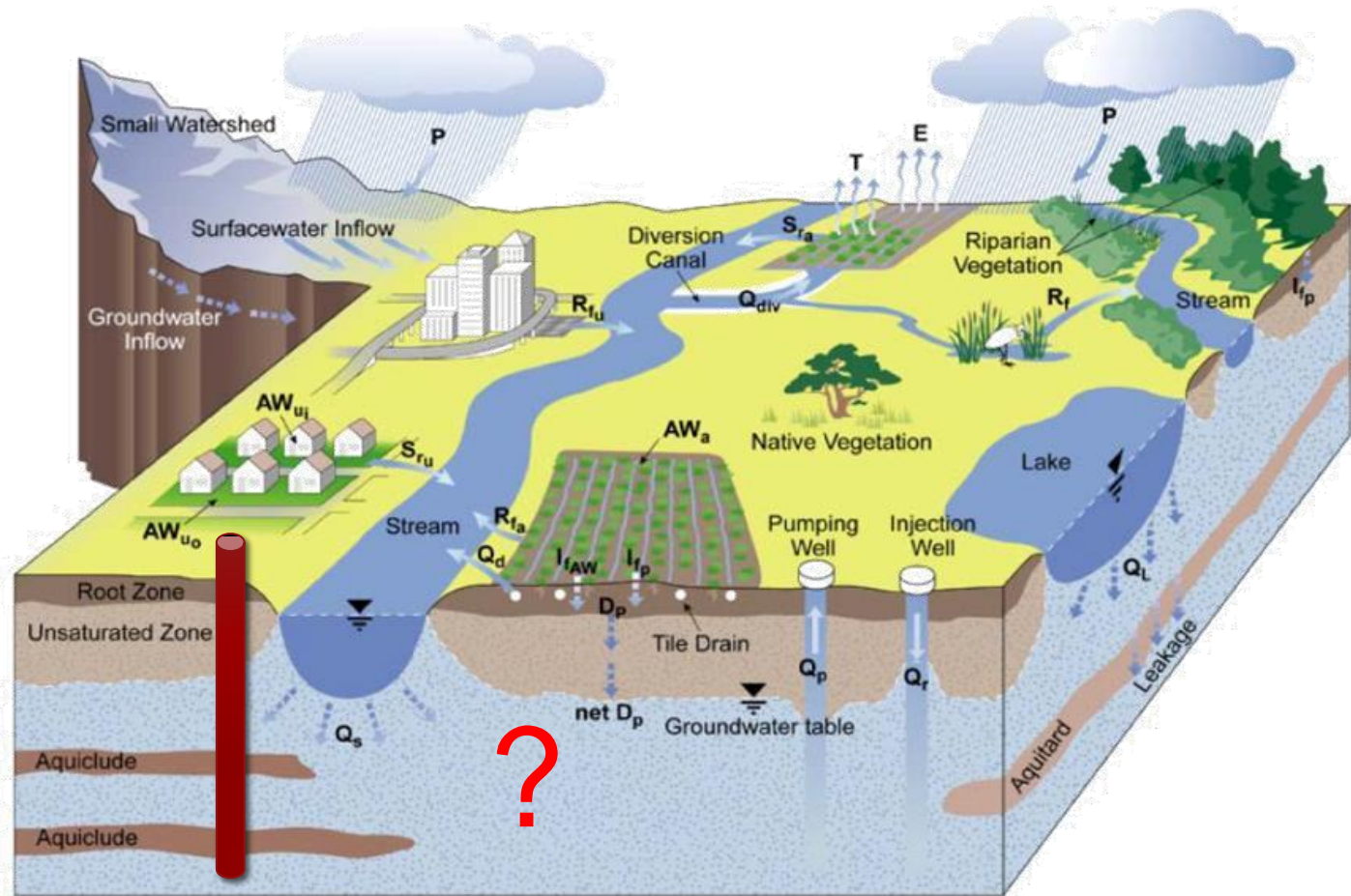


Tom Szenher a'

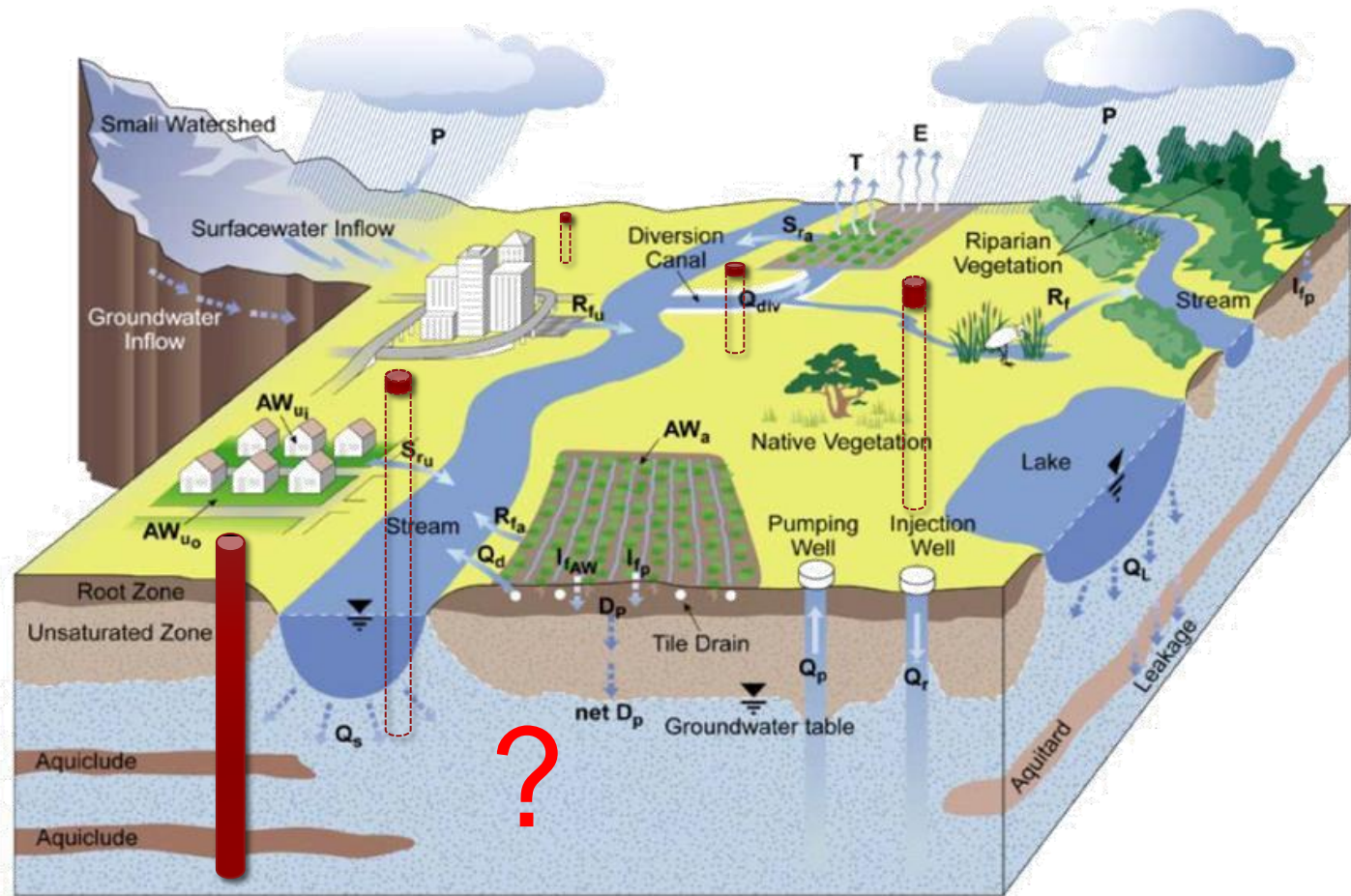
# How do we learn about what lies underneath?



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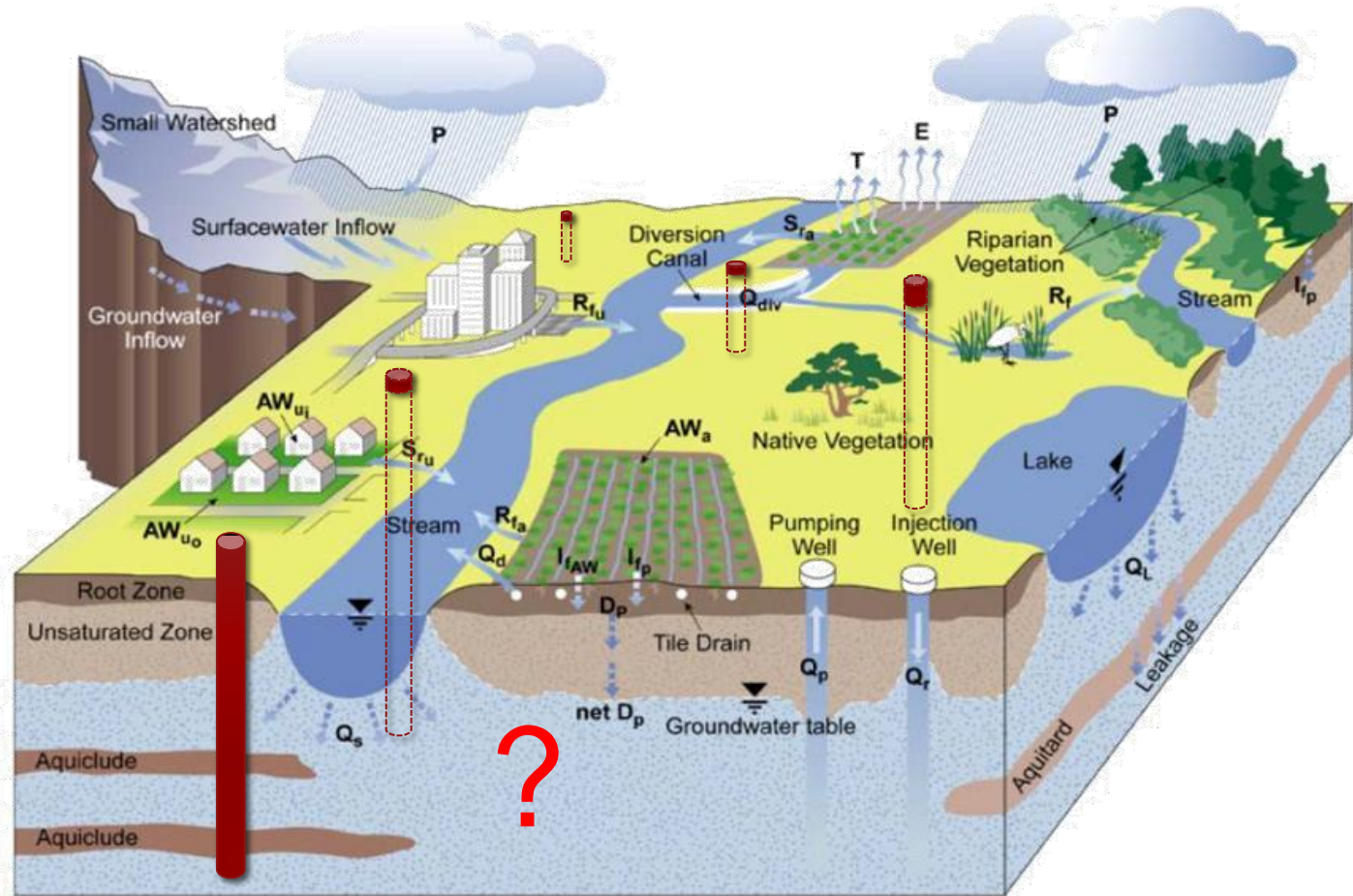


# How do we learn about what lies underneath?

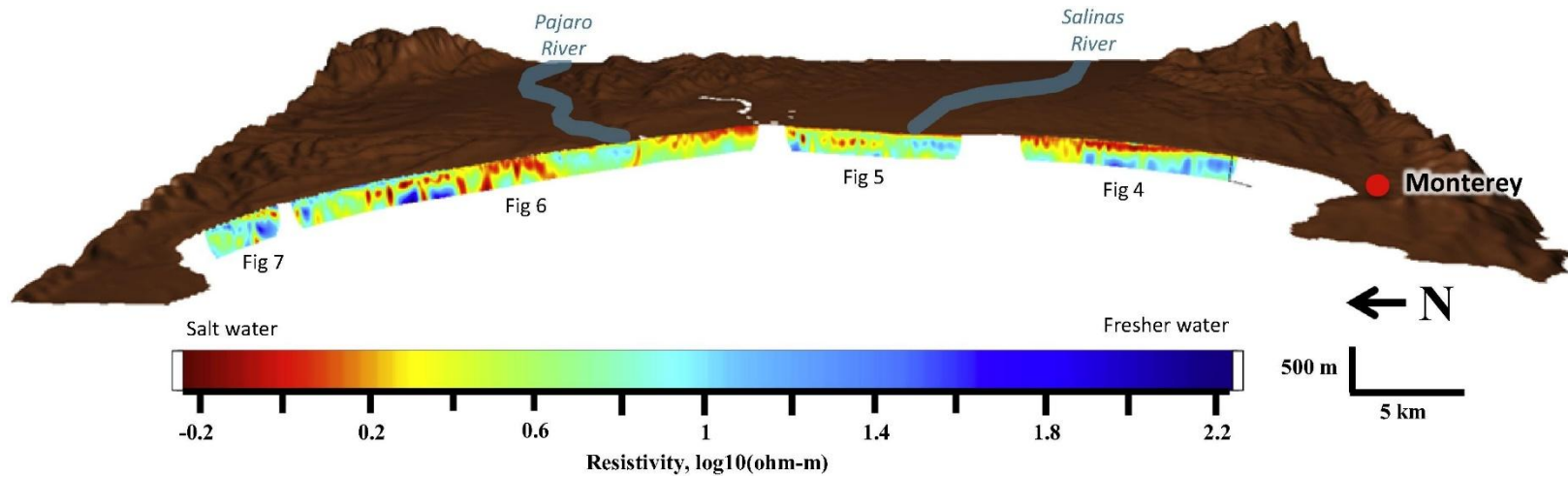


# How do we learn about what lies underneath?

Complex scenarios can be difficult to decipher, even with many wells drilled

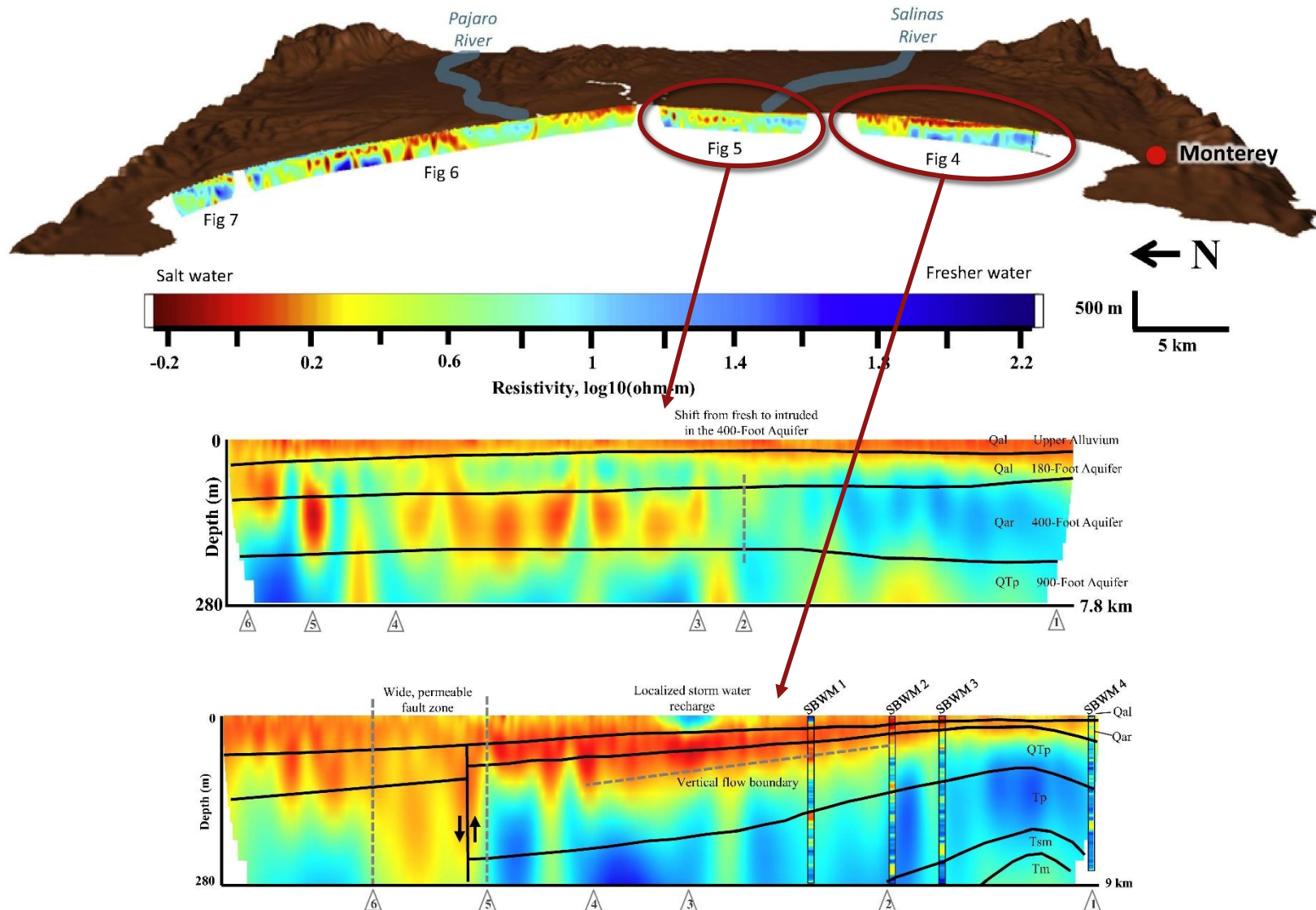


# Geophysics as a method to learn about the subsurface

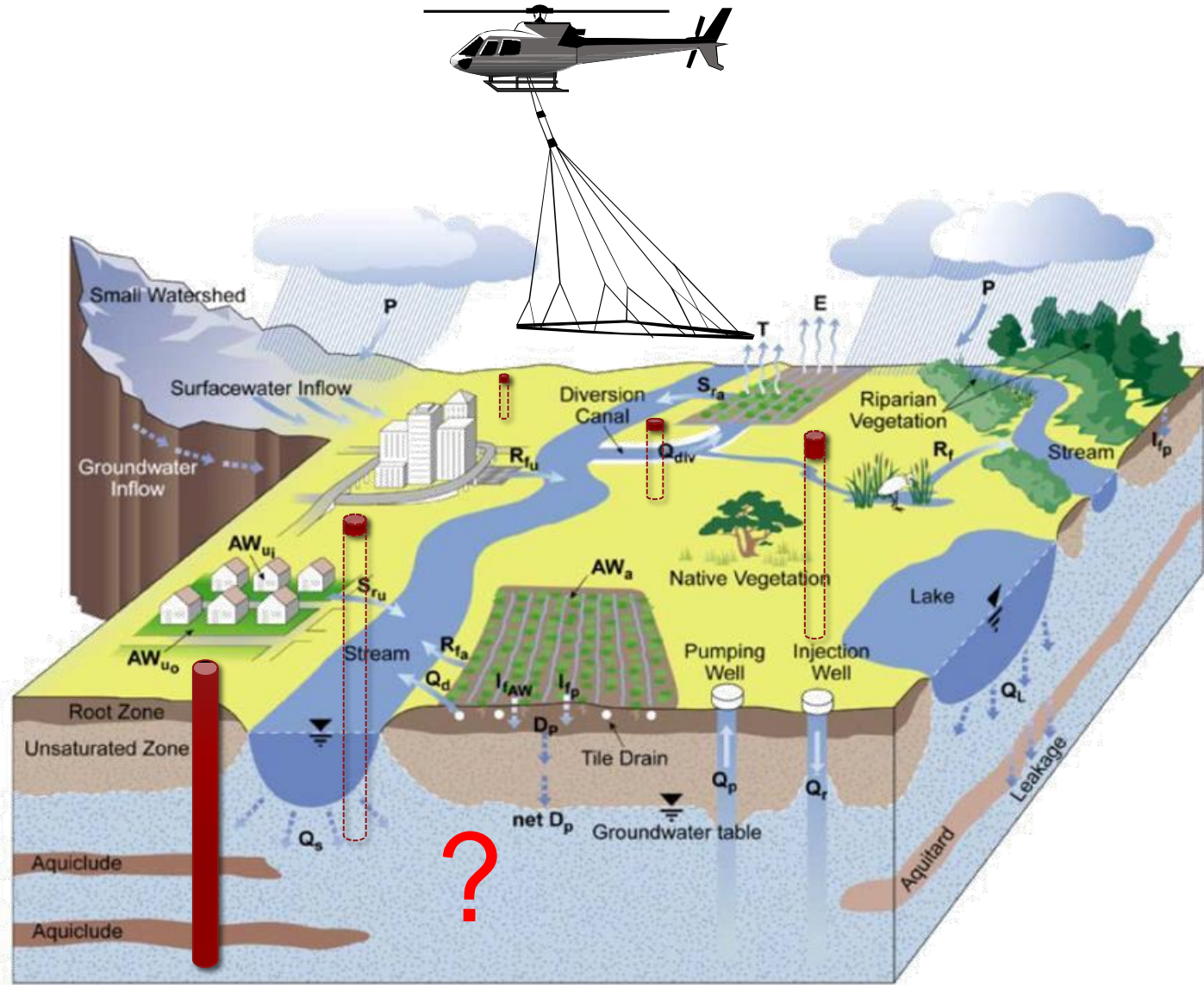




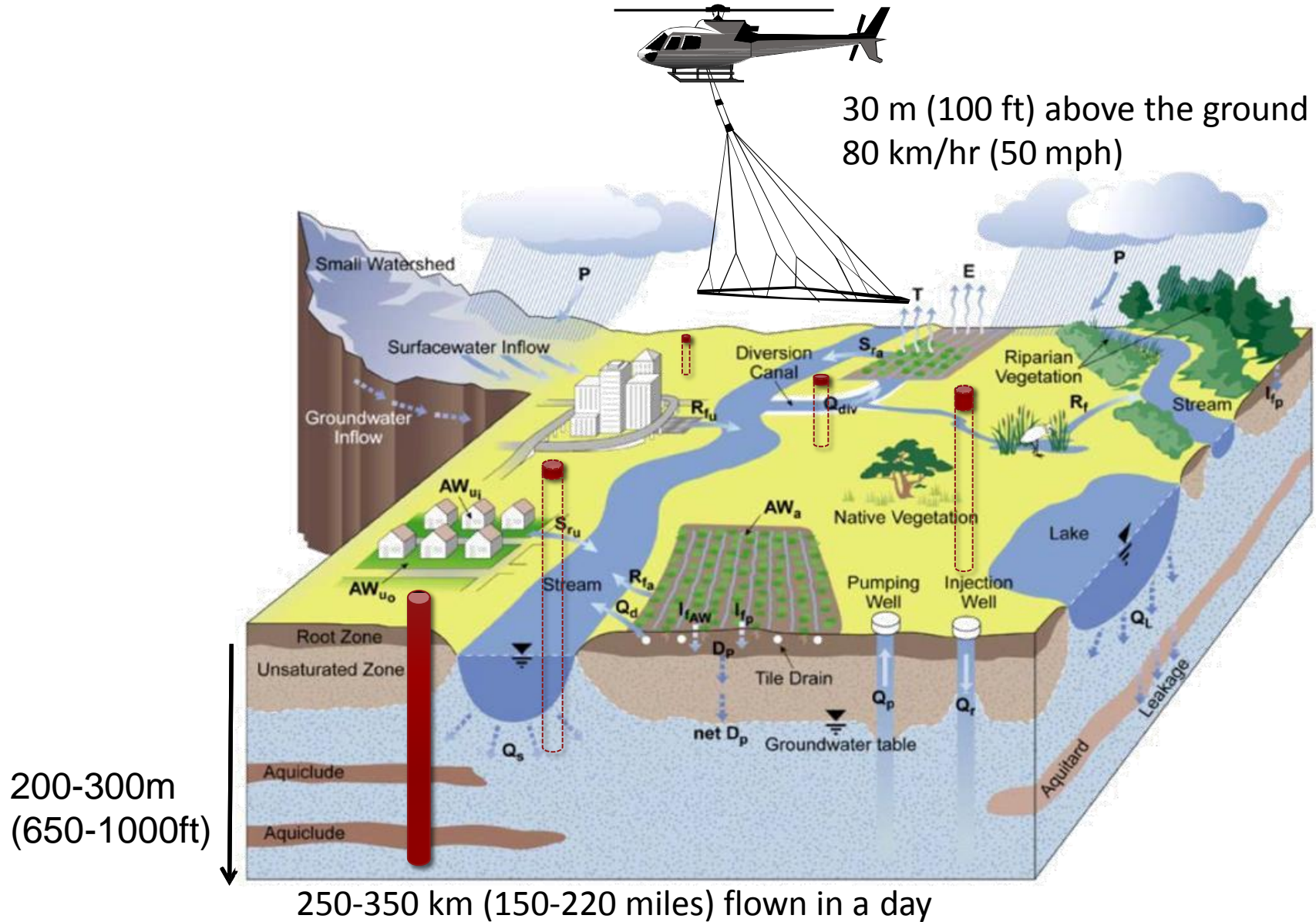
# Geophysics as a method to learn about the subsurface



# Airborne Electromagnetics



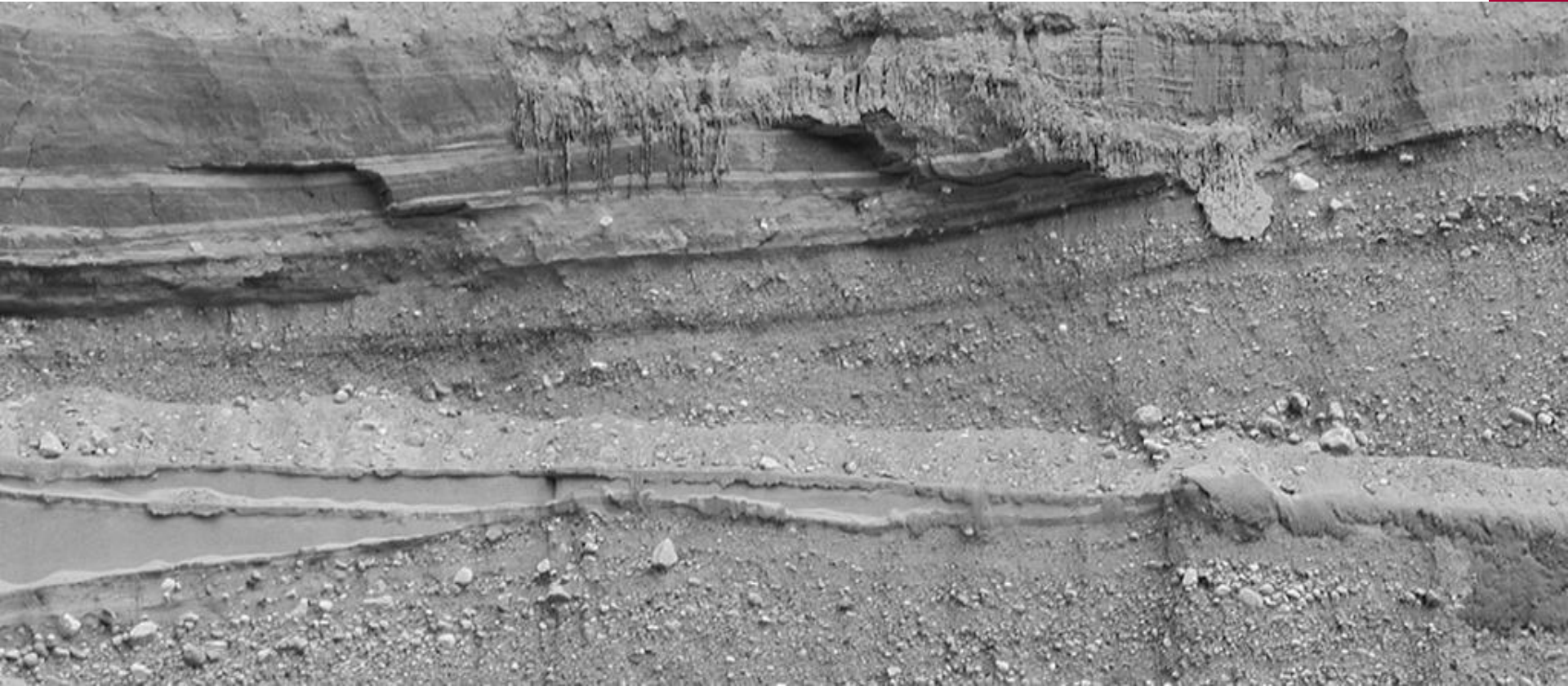
# Airborne Electromagnetics

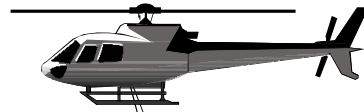




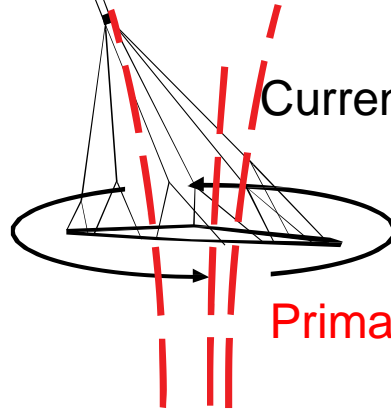


**Current flows around  
transmitter loop**

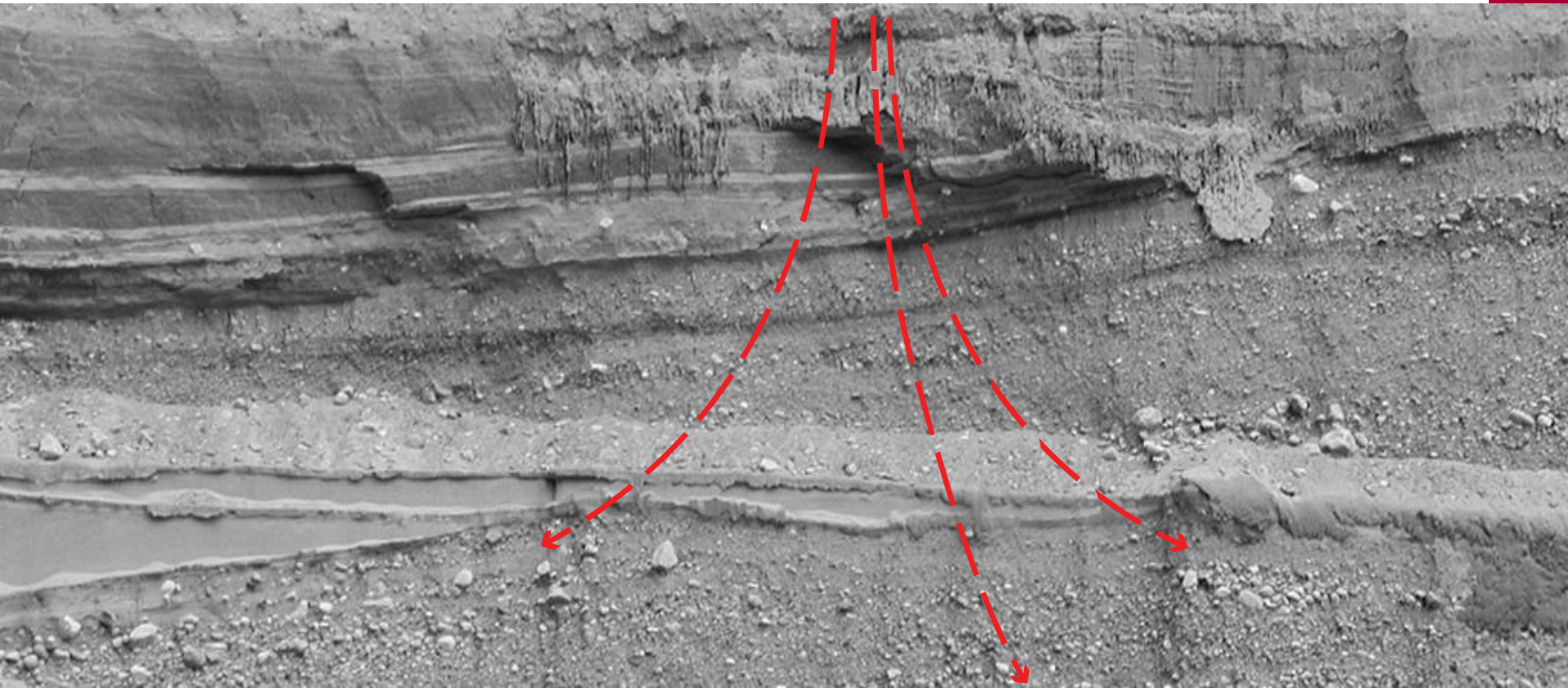


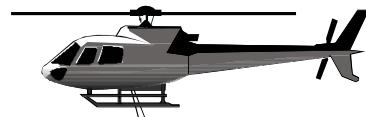


Current flows around transmitter loop

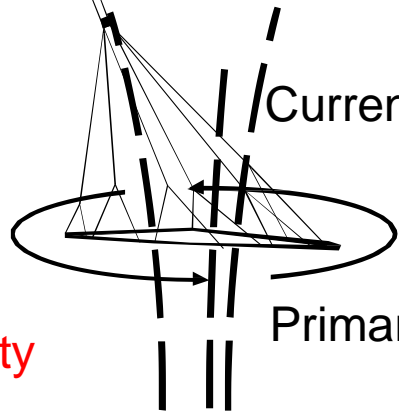


Primary magnetic field generated



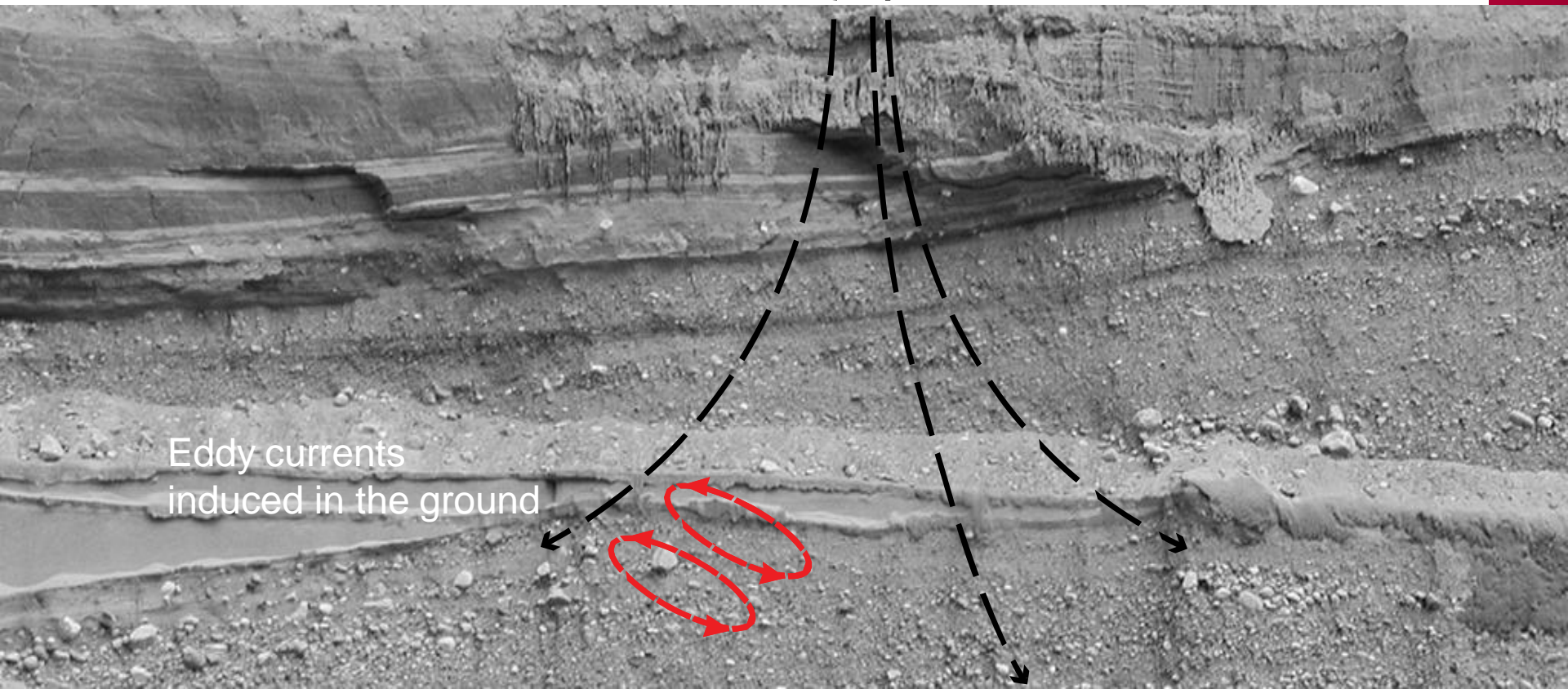


Current flows around transmitter loop

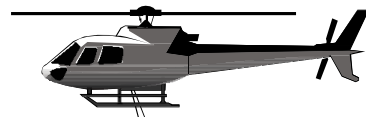


Primary magnetic field generated

depth depends on electrical conductivity



Eddy currents induced in the ground

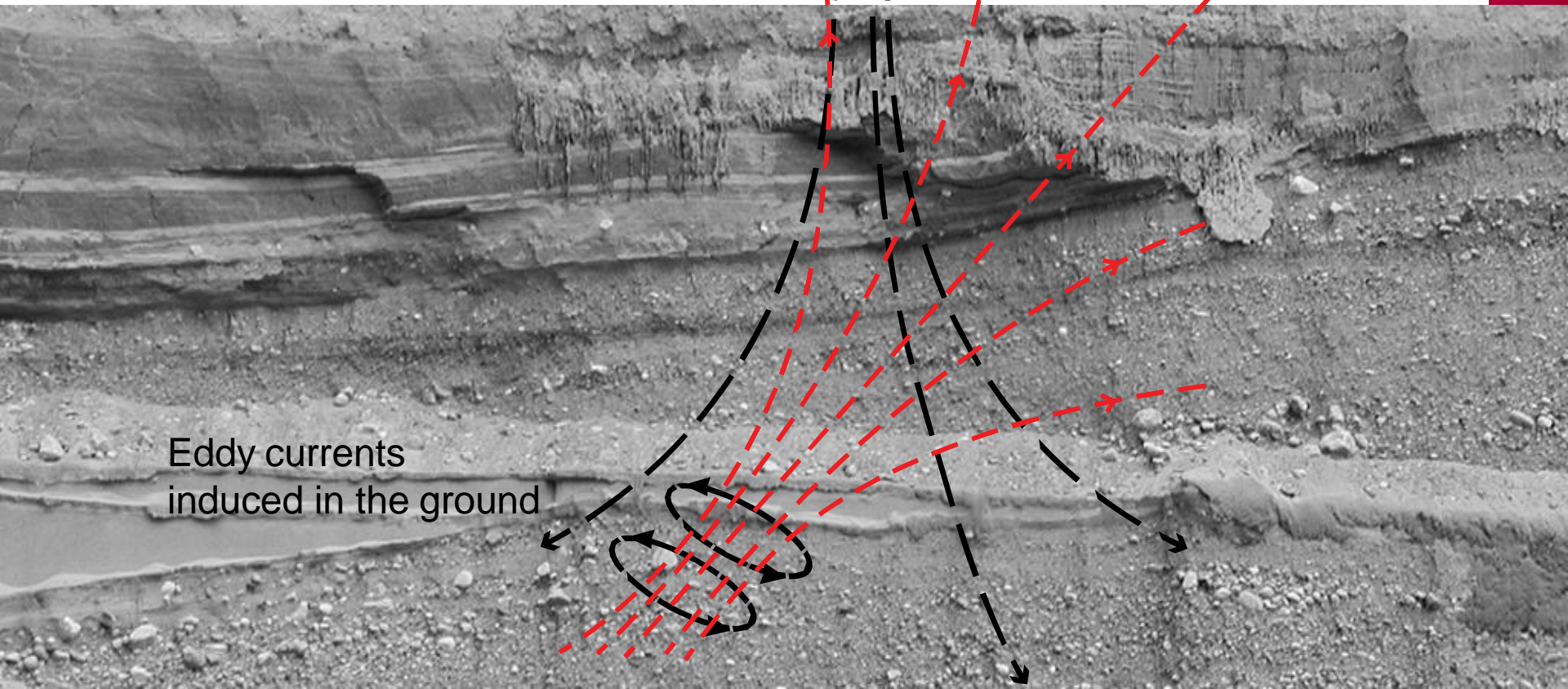


Current flows around transmitter loop



Primary magnetic field generated

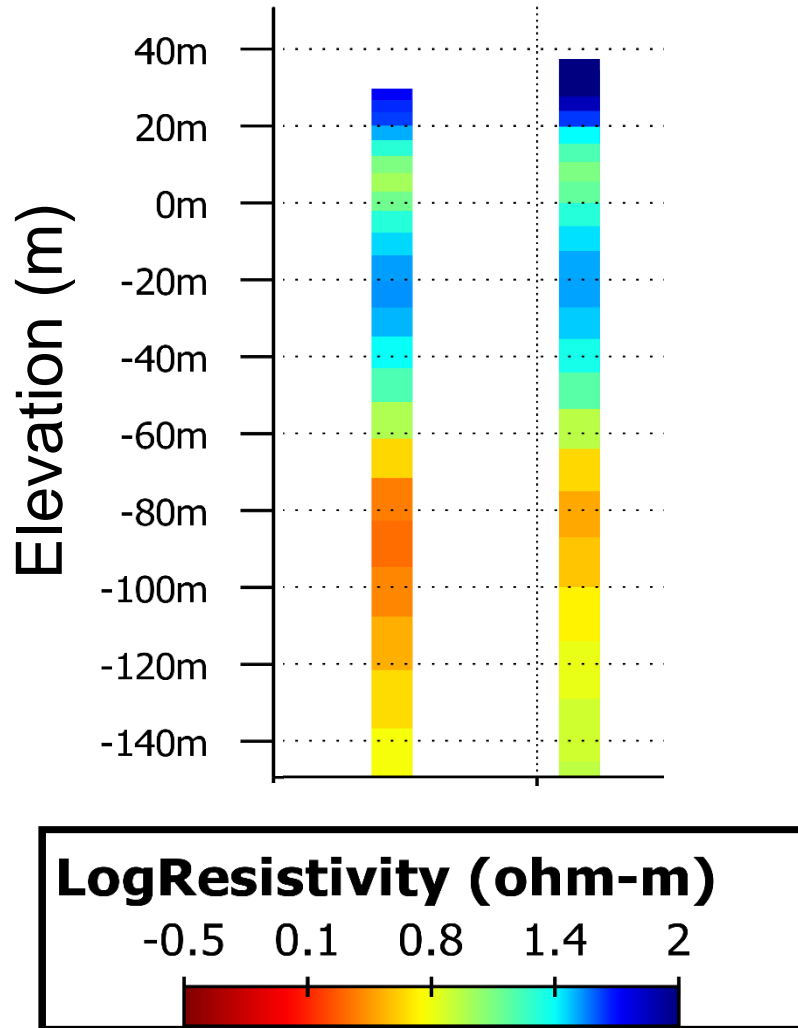
Secondary magnetic field detected by receiver coils



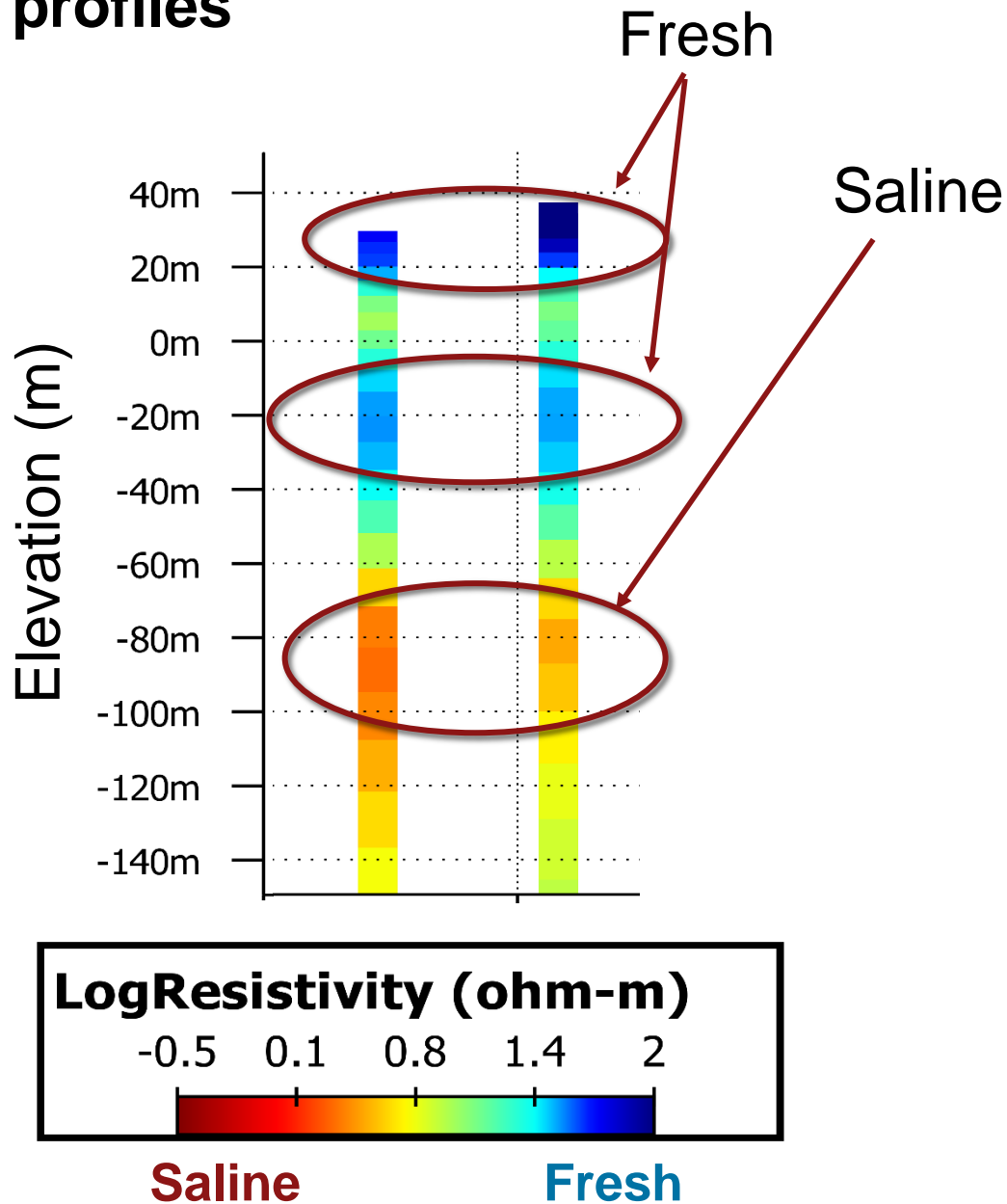
Eddy currents induced in the ground



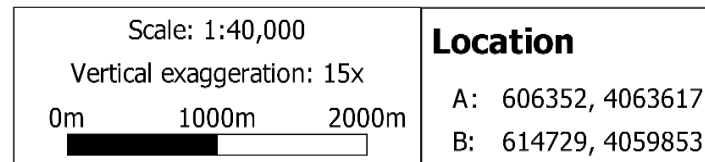
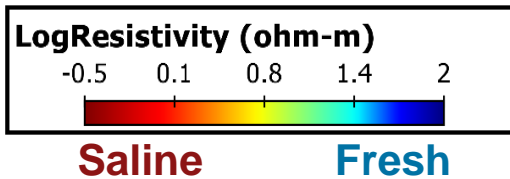
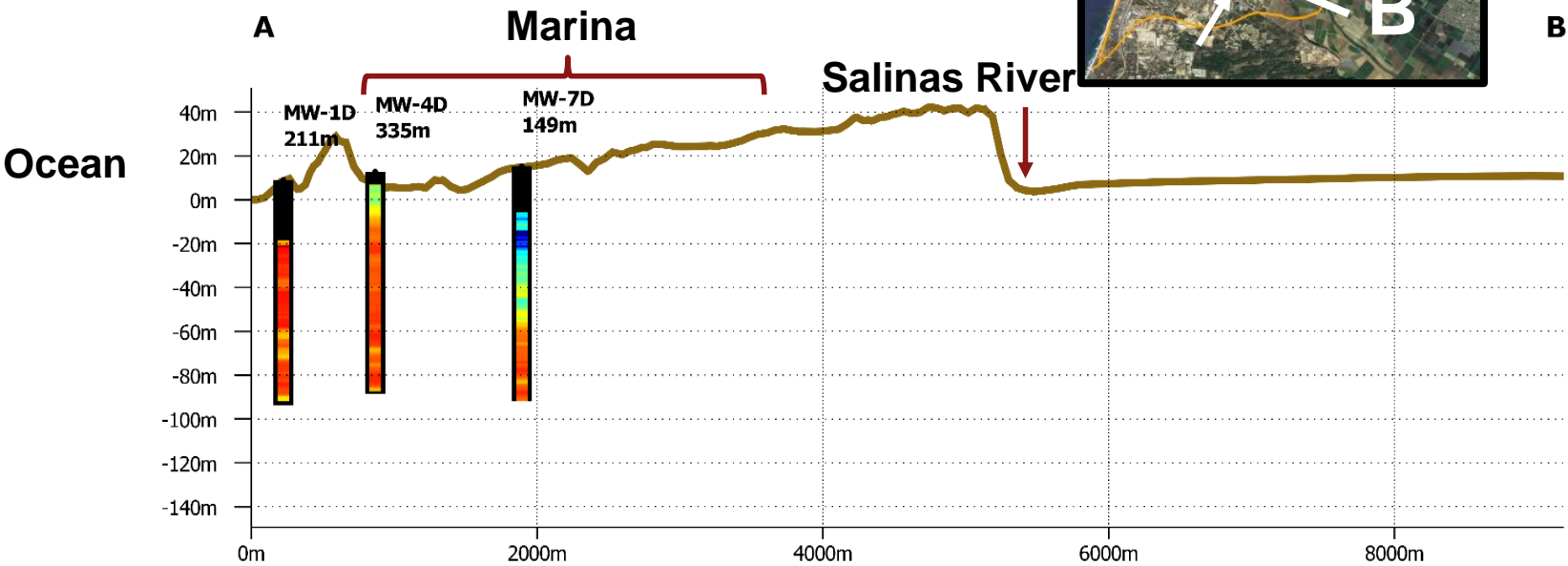
# Resistivity profiles



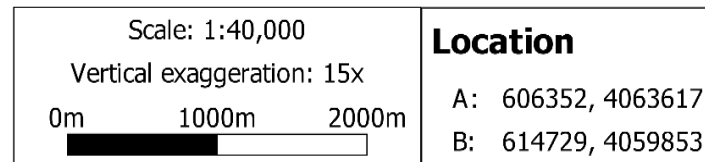
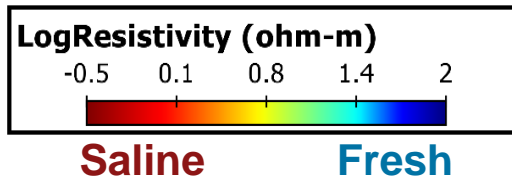
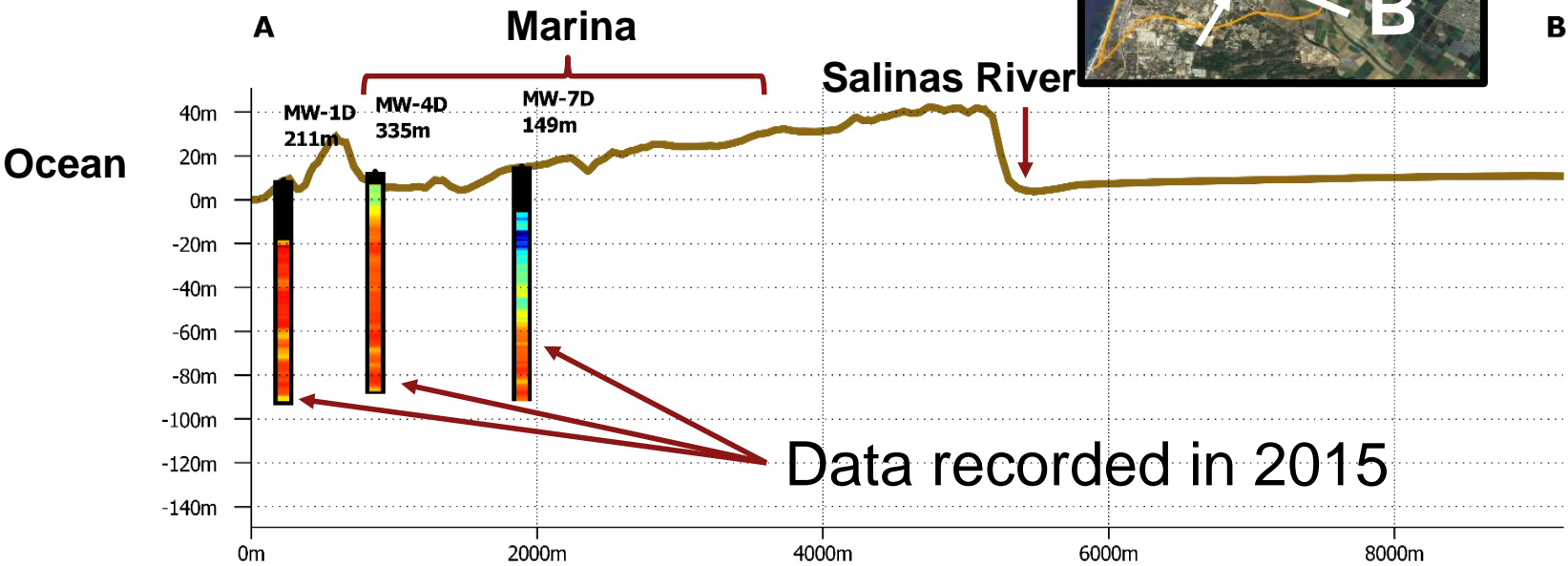
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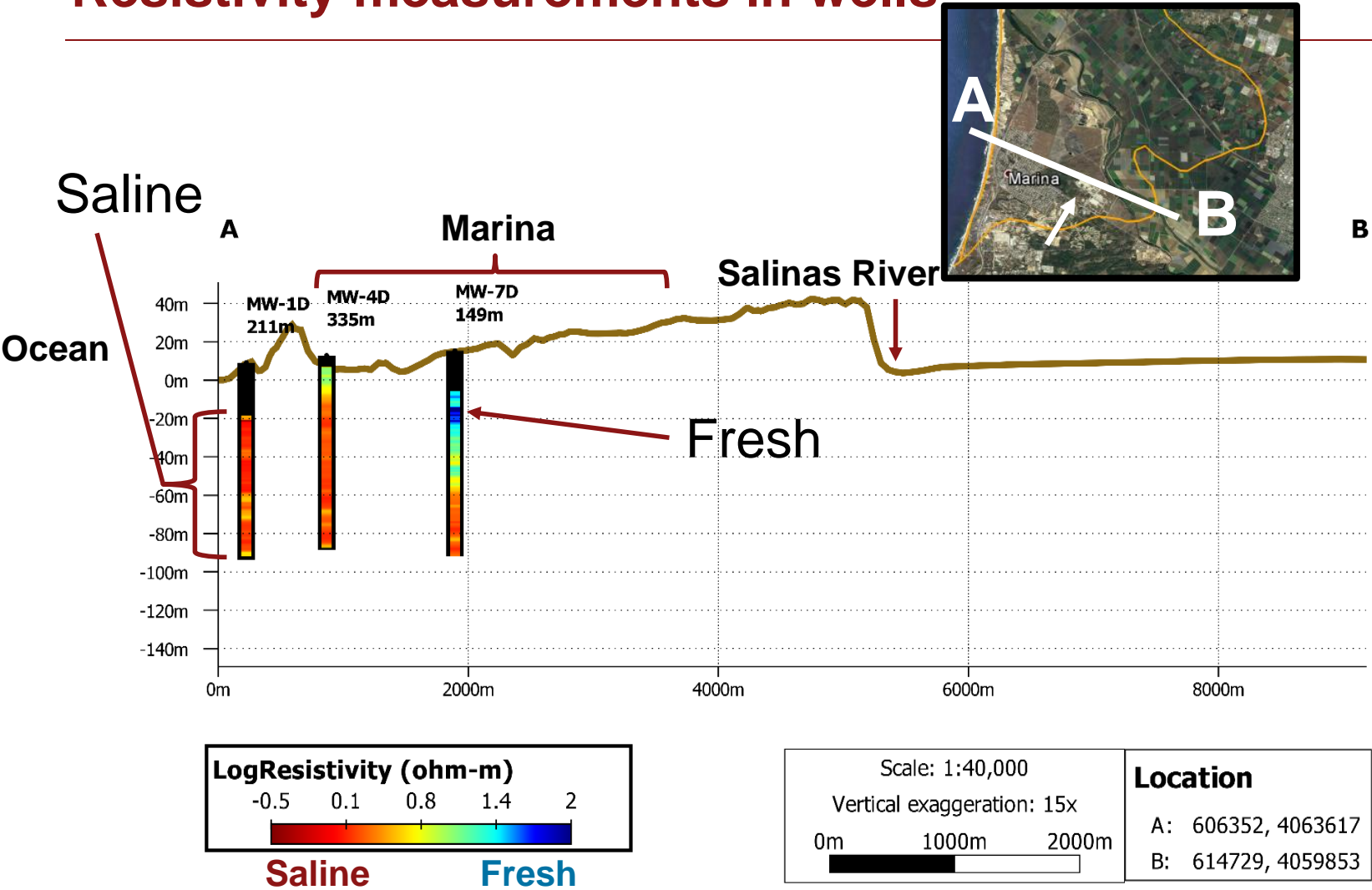
# Resistivity measurements in wells



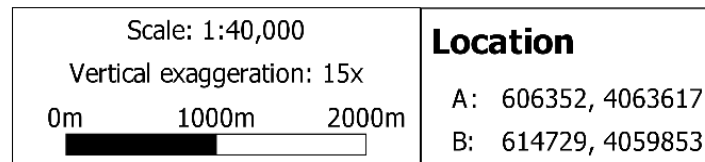
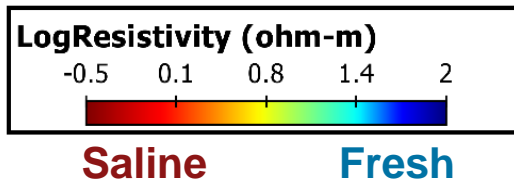
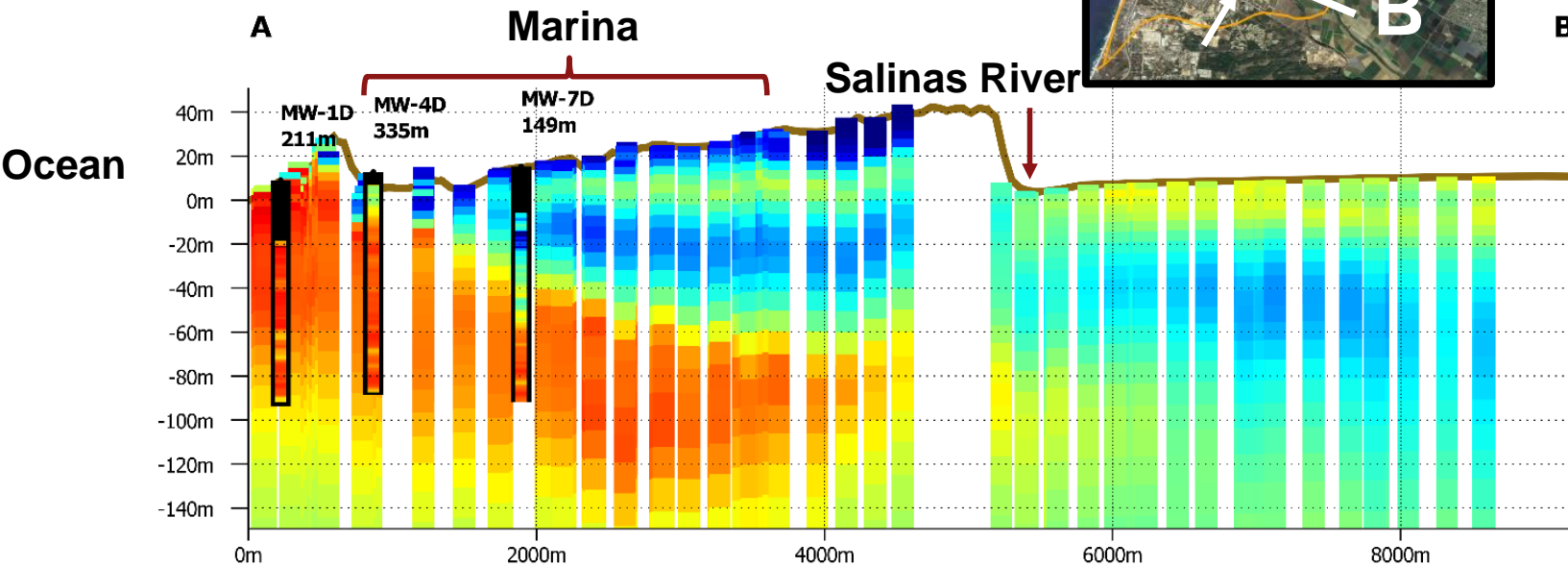
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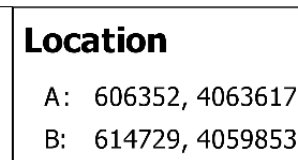
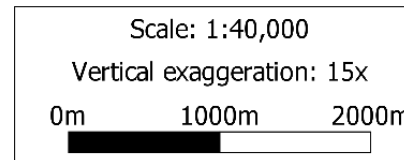
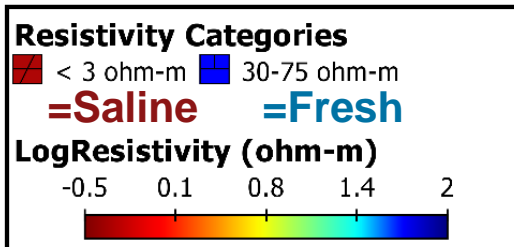
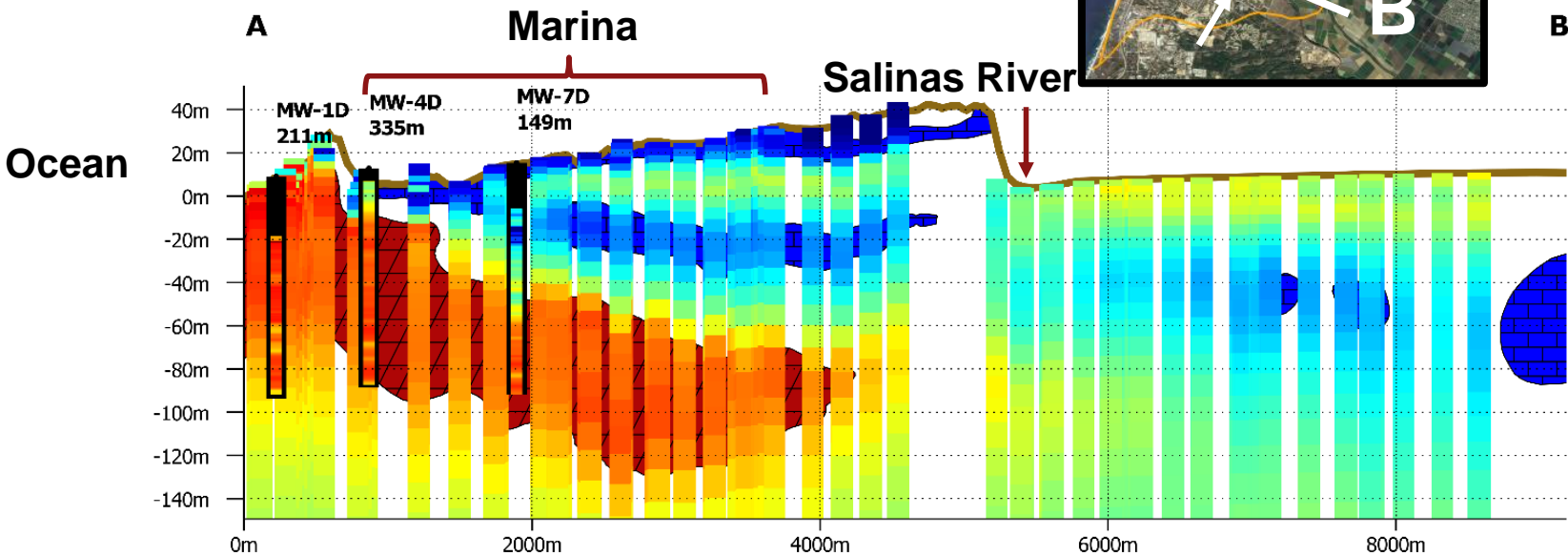
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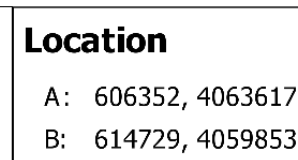
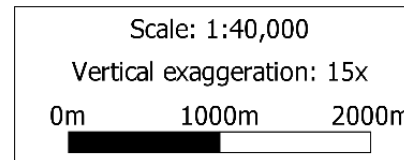
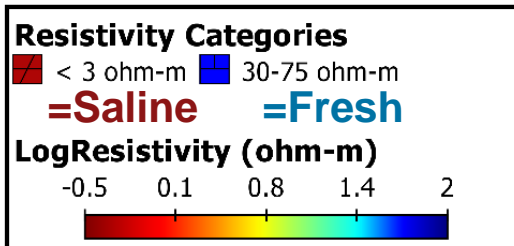
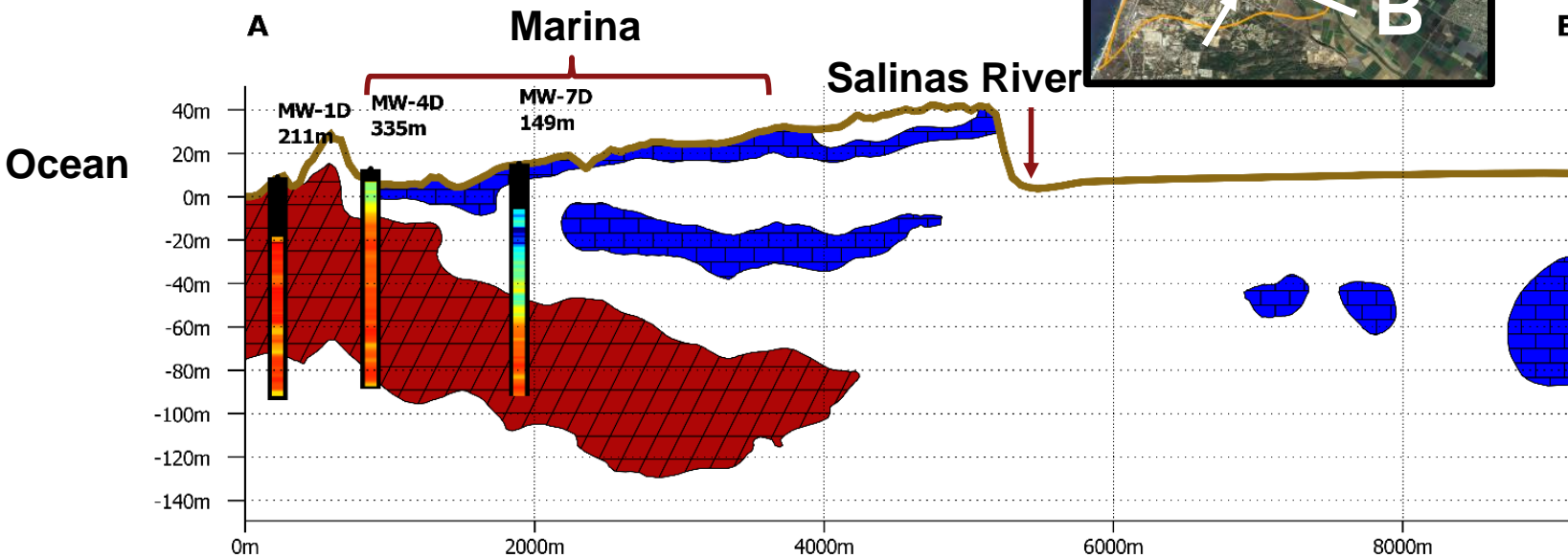
# AEM data expands our knowledge



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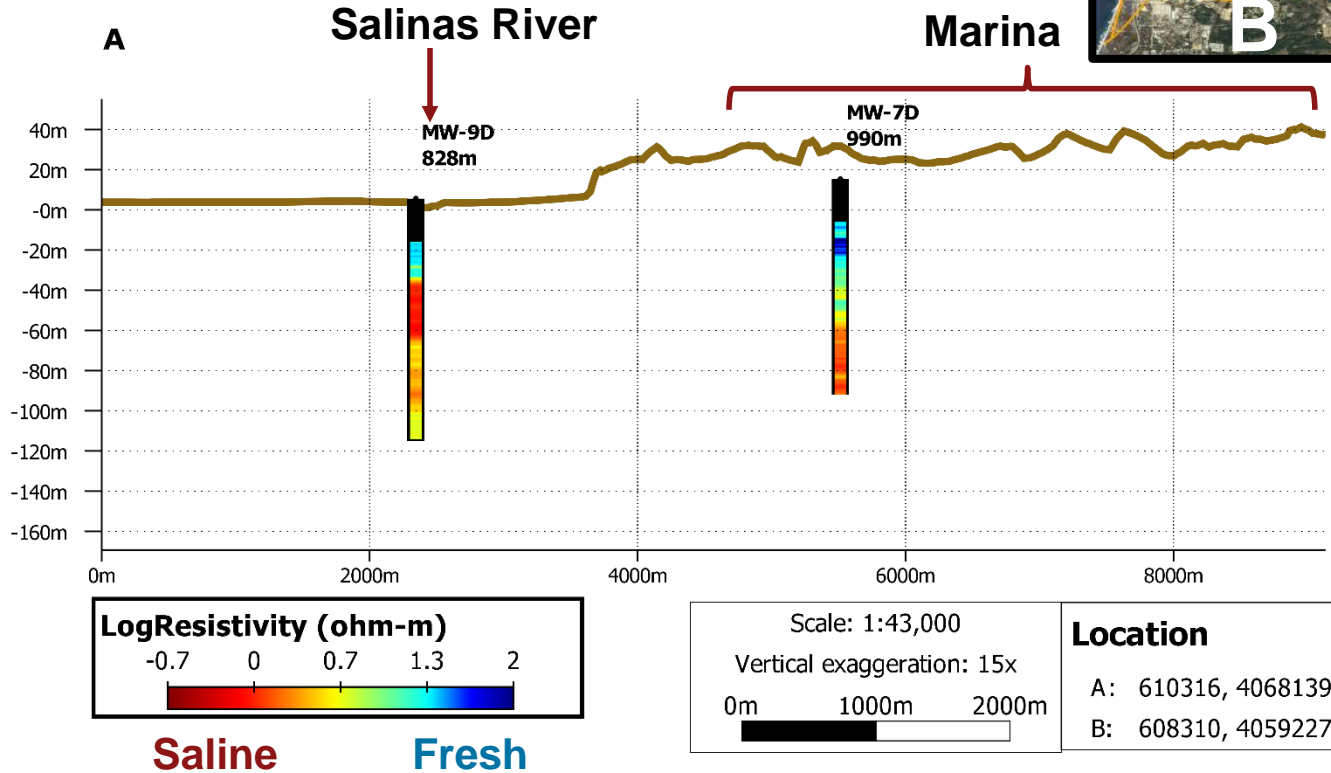


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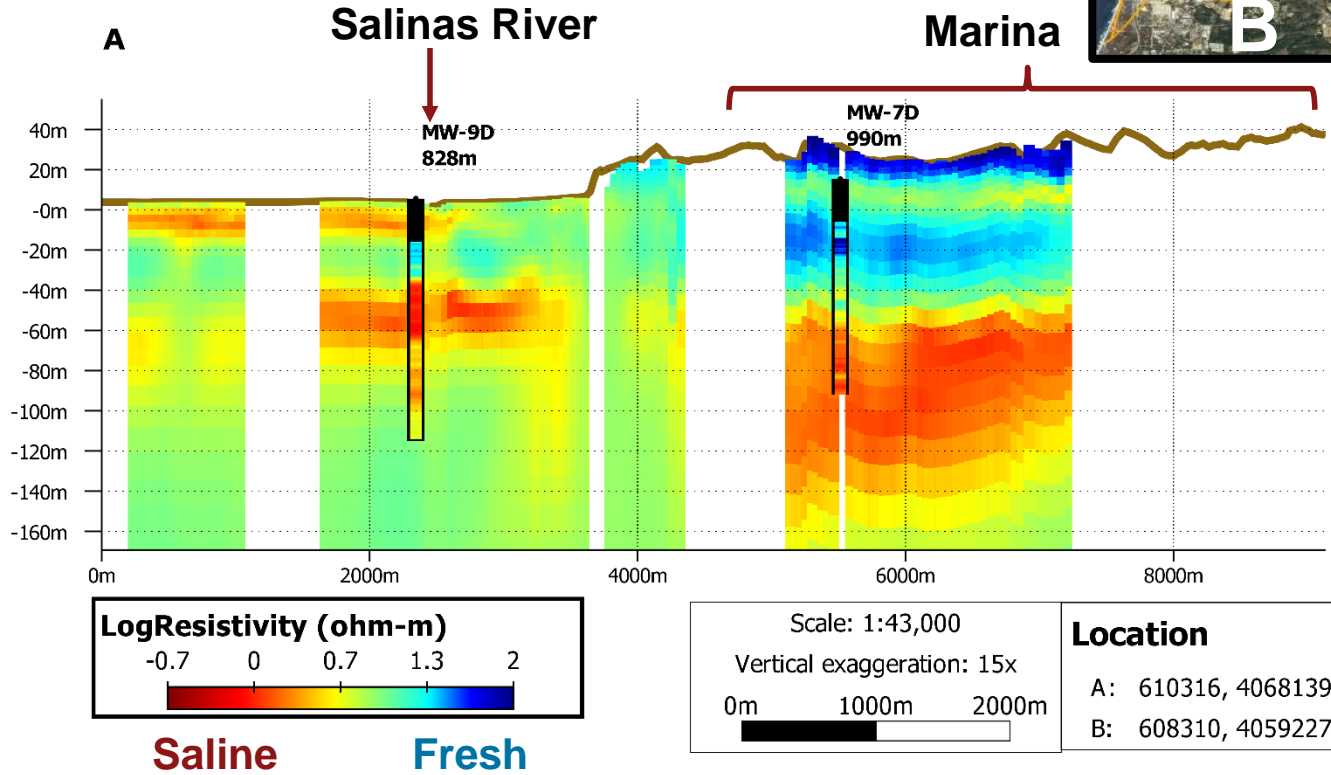




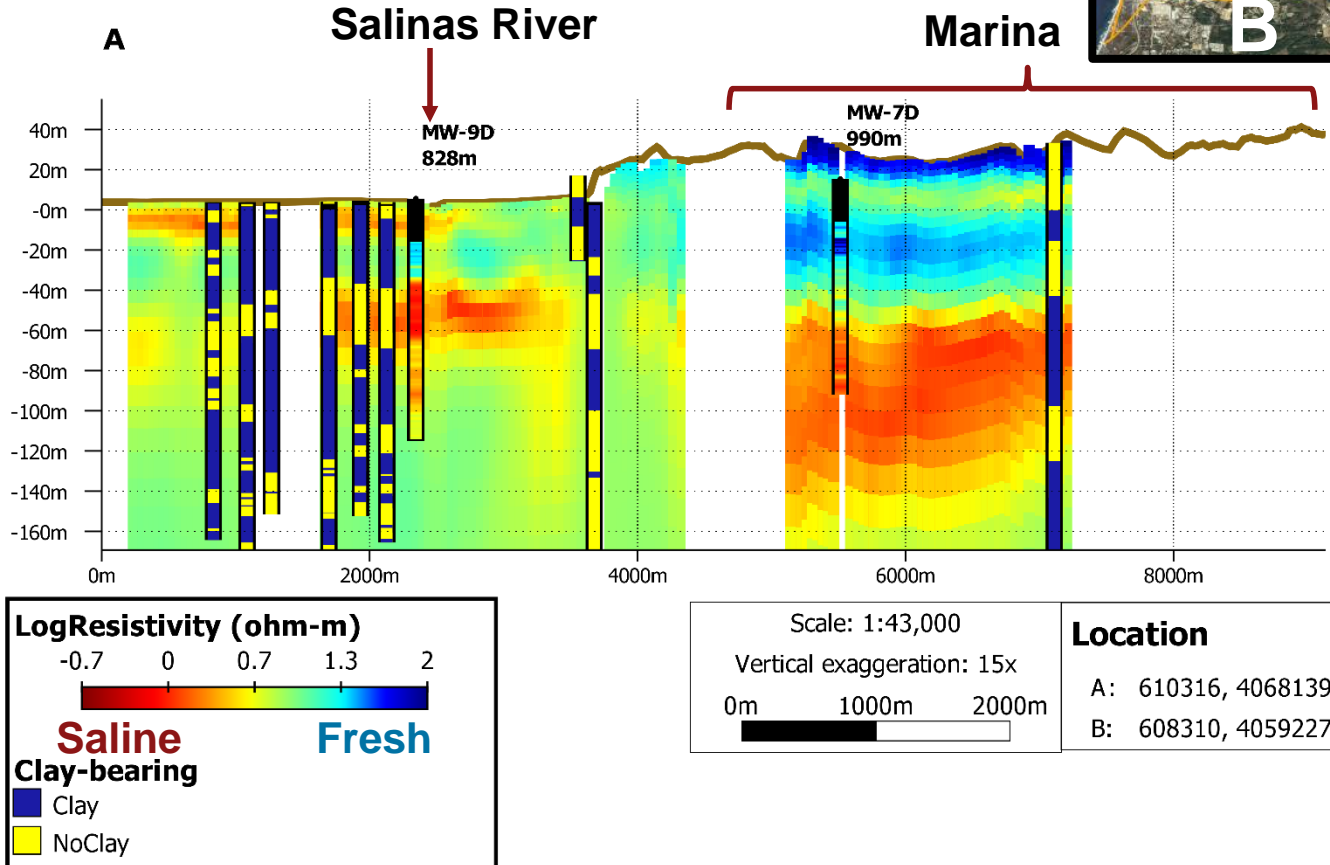
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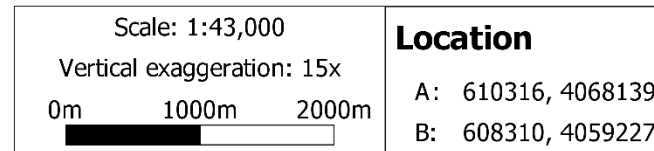
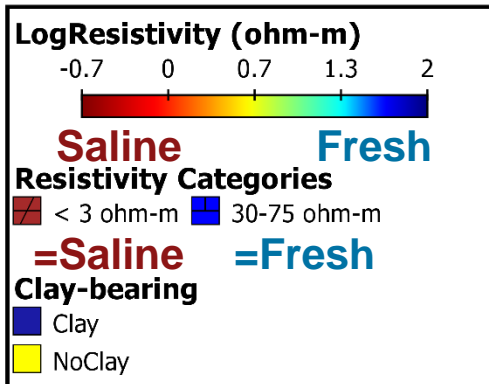
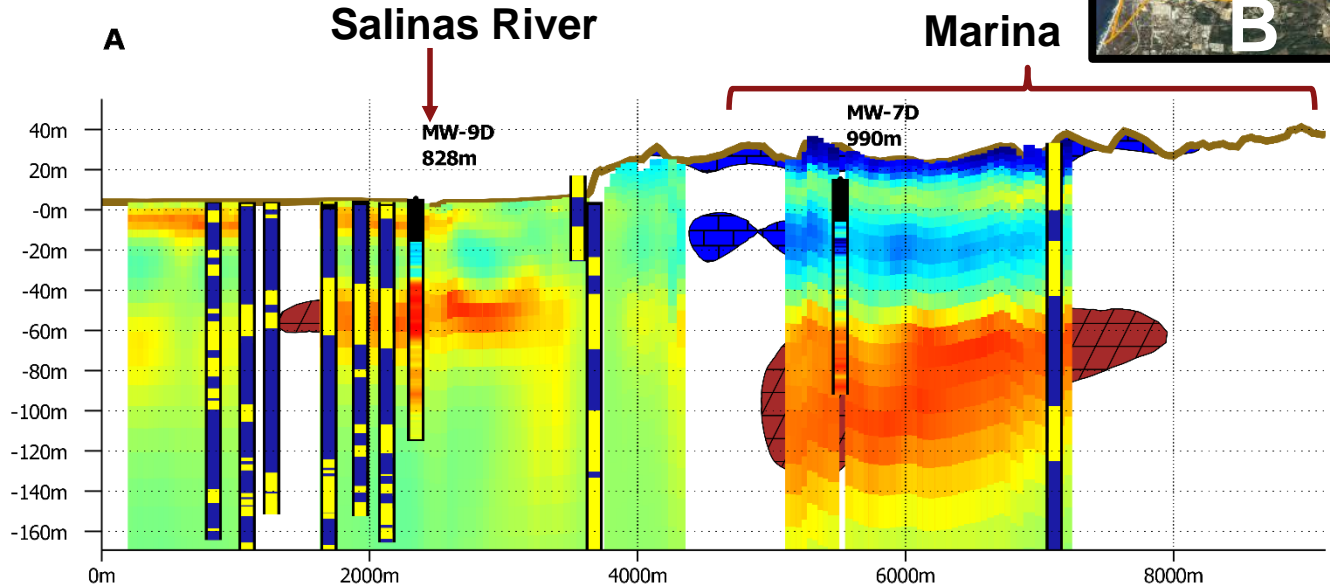
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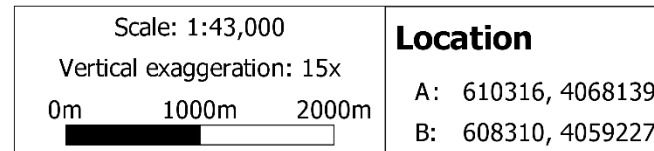
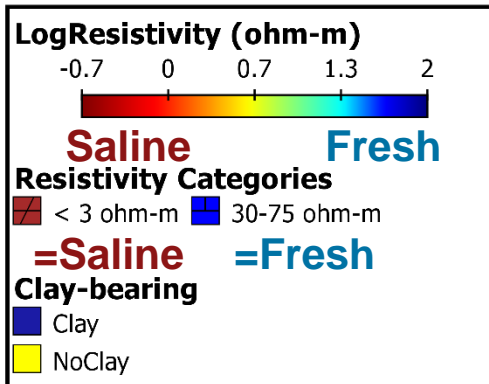
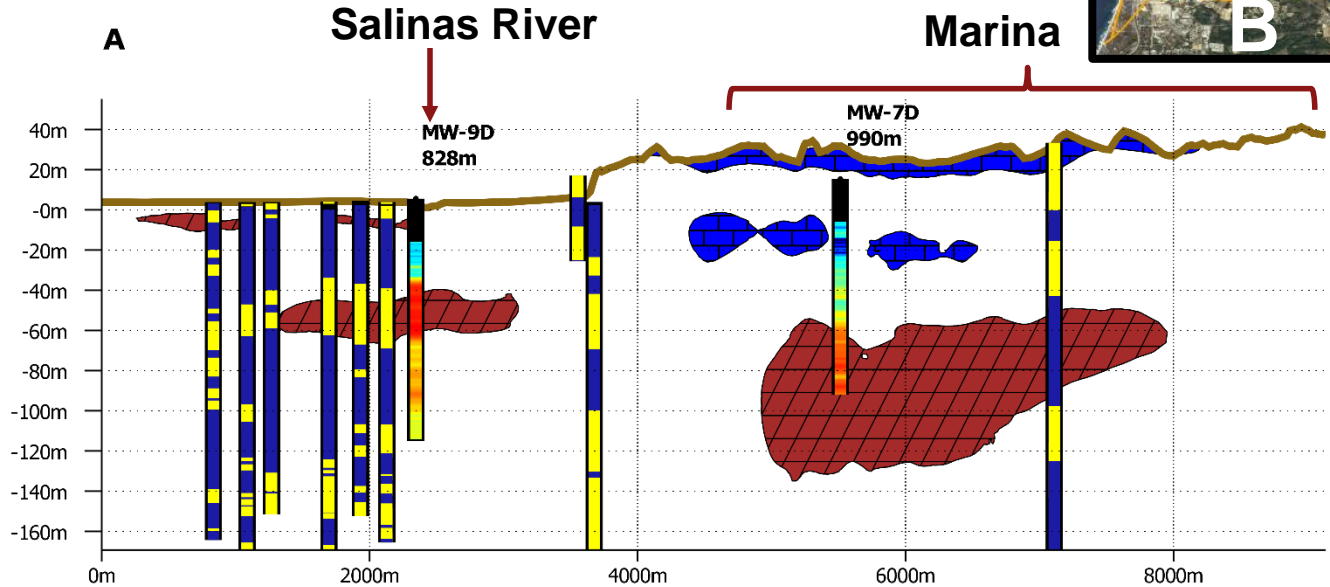
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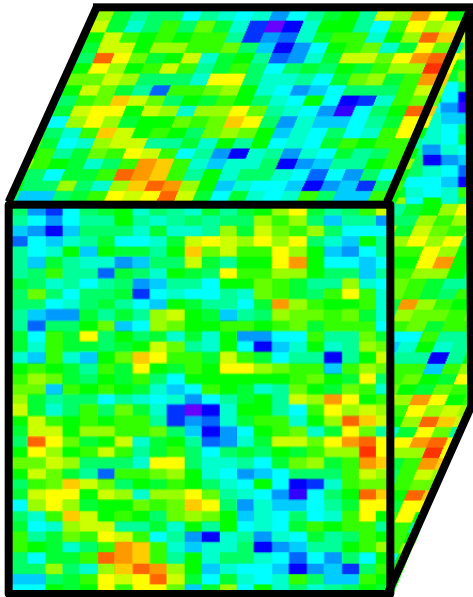


## The data in action (video clip)



# Moving forward

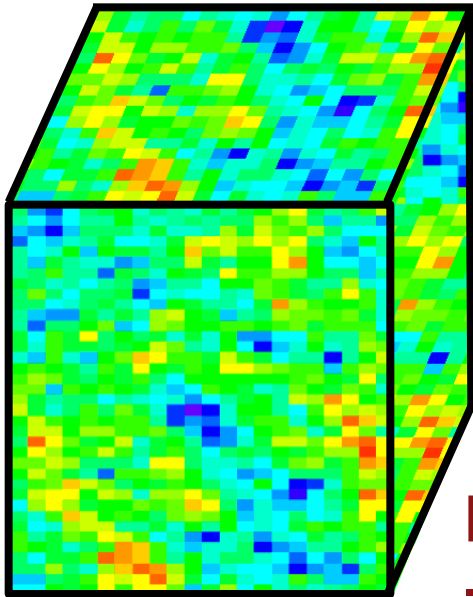
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**geophysical properties that we measure**

## Moving forward

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geophysical properties that we measure



**hydrogeologic information that we want**  
-water quality  
-hydraulic conductivity



# Thank You



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& ENVIRONMENTAL SCIENCES

