

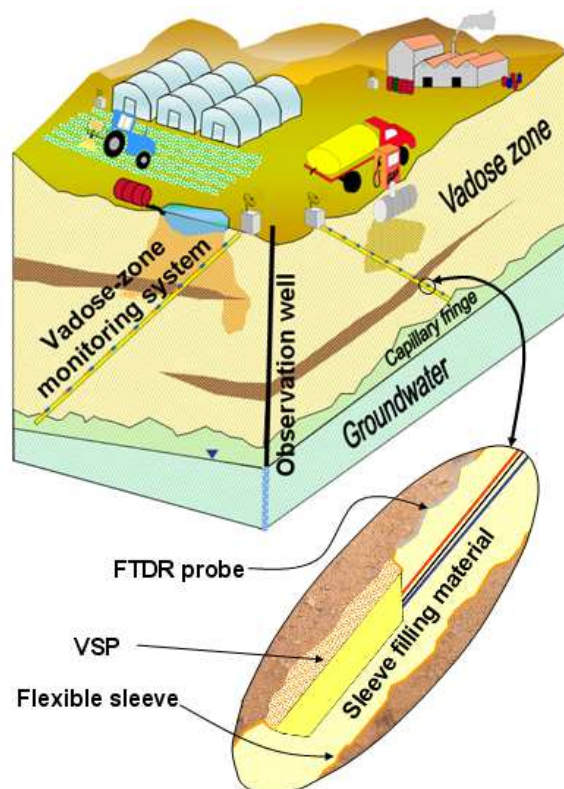
VADOSE-ZONE MONITORING SYSTEM

**KEY TO GROUNDWATER PROTECTION AND OPTIMIZATION OF
REMEDICATION CONDITIONS**

Minimization subsurface pollution and optimization of remediation efficiency depend on reliable and effective monitoring tools that provide real-time information on the chemical and hydrological state of the percolating water. Today, most monitoring programs are based on observation wells that samples groundwater. As such, identification of pollution in well water is clear evidence that the contaminants already crossed the vadose-zone and accumulated in groundwater. Unfortunately, only little can be done to fully remediate contaminated aquifers. Accordingly, effective monitoring program that aims at protecting groundwater from potential pollution must include vadose-zone monitoring technologies that provide real-time information on the hydrological and chemical properties of the percolating water, long before contaminants reach the water table. Hence, efficient and cost effective vadose-zone monitoring system provides "early warning" for potential contamination that may risk groundwater. Moreover, implementation of the vadose zone monitoring system in the vadose-zone of a site that undergoes active remediation operation provides real time information on the actual chemical and hydrological conditions in the vadose zone. Such information is critical for proper assessment of the remediation strategies.

AMETIS implements novel *Vadose zone Monitoring Systems (VMS)* that allows real time continuous monitoring of the hydrological and chemical properties of percolating water along the deep sections of vadose zone. Up-to-date the system has been successfully implemented in several research projects on water flow and contaminant transport in various hydrological and geological setups including: (a) floodwater infiltration from stream channels and reservoirs, (b) land use impact on groundwater quality, (c) influence of intensive agriculture on groundwater quality and (d) control of remediation process in a contaminated vadose zone (see related publications and projects)

AMETIS provides a full monitoring solution to customers in the private and public sectors that are exposed to pollution risk and need continuous reliable information on the status of contaminants in the subsurface of their property. The monitoring services are designed to enable early detection of subsurface pollution as well as facilitating efficient remediation operations.



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A M E T I S
Advanced Monitoring Technologies

Related publications

- Dahan, O., McDonald, E.V. and Young, M.H., 2003. Flexible time domain reflectometry probe for deep vadose zone monitoring. *Vadose Zone Journal*, 2(2): 270-275.
- Dahan, O., Shani, Y., Enzel, Y., Yechieli, Y. and Yakirevich, A., 2007. Direct measurements of floodwater infiltration into shallow alluvial aquifers. *Journal of Hydrology*, 344(3-4): 157-170.
- Dahan, O., Tatarsky, B., Enzel, Y., Kulls, C., Seely, M. and Benito, G., 2008. Dynamics of flood water infiltration and ground water recharge in hyperarid desert. *Groundwater*, 46(3): 450-61.
- Dahan, O., R. Talby, Y. Yechieli, E. Adar, N. Lazarovitch, and Y. Enzel. 2009. In-situ monitoring of water percolation in layered soils using a vadose-zone monitoring system. *Vadose zone Journal*
- Rimon, Y., Dahan, O., Nativ, R. and Geyer, S., 2007: Water percolation through the deep vadose zone and groundwater recharge: preliminary results based on a new vadose-zone monitoring system. *Water Resources Research* (43, W05402, doi:10.1029/2006WR004855).

Related projects

1. Direct measurement of flood water percolation in arid lands. ***International Arid Lands Consortium; Israel Science Foundation; European Commission, 6th Framework Program (WADE)***.
2. Quantity and quality of groundwater recharge into the Coastal Plain Aquifer under undeveloped, agricultural and urban setups. ***International Atomic Energy Agency; Bundesministerium fur Bildung Wissenschaft, Forschung (BMBF); Israel Science Foundation***
3. The influence of dairy farming on the groundwater quality in the coastal plain aquifer. ***Israel Water Commission***.
4. Assessment of the direct impact of intensive agriculture on groundwater quality. ***Israel Water Commission***.
5. On line monitoring of the vadose zone hydraulic and chemical properties as a tool for improving remediation efficiency. ***LDD; PAZ oil company Ltd.***

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