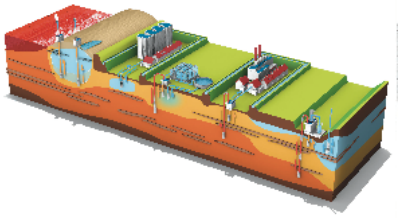
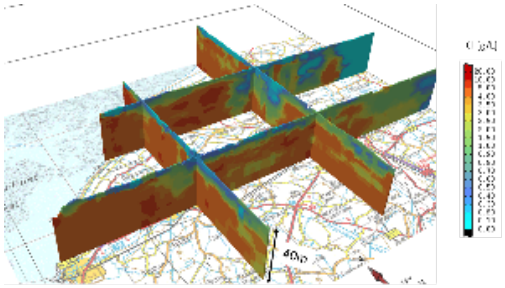
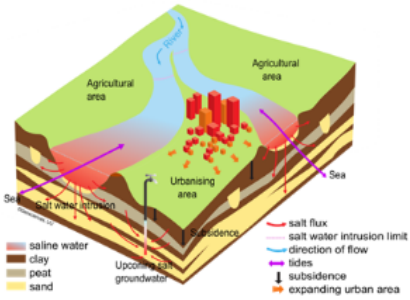
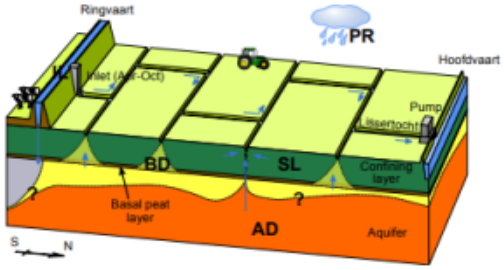
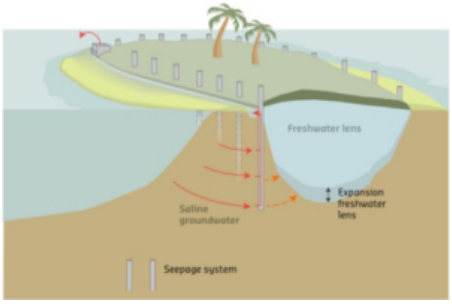
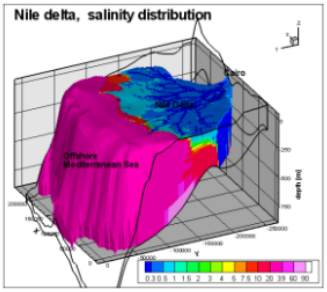
Projects

Deltares works on various projects on salinisation within themes groundwater, surface water and infrastructure. The table below shows an overview of current and past projects with short descriptions, including the relevant themes, region, approach and time period. More detailed descriptions are available by clicking on a project's title. Please note that by clicking on the column headers, the theme columns can be used to sort by your theme of interest:
GROUND / SURFACE / INFRA.

	Project	G	S	I	Region	Approach	Period
	**COASTAR** COASTAR is aimed at large scale freshwater supply by clever use of the subsurface. By storing freshwater underground and utilising brackish water, coastal areas can be provided with enough water to be used for drinking, irrigation and industry, now and in the future!	✓			The Netherlands		2016-present
	FAME Freshwater Availability in the Mekong Delta (FAME) is a collaborative, multiphase project focusing on scoping, piloting and providing upscaling advice to national partners in Vietnam on the implementation of shallow Aquifer Storage and Recovery (ASR) systems. These systems could provide farm-scale solutions to address the water-quality and availability issues being faced in Ben Tre and Trah Vinh provinces in the Mekong Delta, Vietnam.	✓			Vietnam		2019-present
	**FRESHEM** Fresh water supplies cannot be taken for granted in the Province of Zeeland in the Netherlands. The main surface waters are predominantly saline. A detailed picture of the current fresh-salt water distribution is essential to detect possible trends in the subsoil and to respond in time to these trends. This project developed an approach to determine the three-dimensional chloride distribution in the groundwater by using HEM surveys in combination with a priori data, advanced modelling techniques and information about the groundwater system and especially geology.	✓			The Netherlands	Airborne EM and numerical modelling	2010-2016
	Haringvliet - Kier Enhancing fish migration leads to salt intrusion into fresh water reservoir. How to manage the salt water intrusion and maintain the fresh water supply to drinking water, agriculture and industry (Port of Rotterdam) is the challenge.		✓	✓	The Netherlands	Field experiments, 3D hydrodynamic modeling	<period>

	Krammer Locks The Krammer locks form the boundary between the saline Eastern Scheldt and the fresh water Lake Volkerak-Zoom. The locks will have a new method of limiting salt intrusion as a result of lock-operation by by using bubble screens and flushing with fresh water. To optimise lock-operation and manage salt intrusion into the fresh water lake, a decision support system is setup.		✓	✓	The Netherlands	Sea Lock Formulation	<period>
GO-FRESH	**GO-FRESH** The goal of GO-FRESH (Geohydrological Opportunities Fresh Water supply) is to improve the use of existing fresh groundwater resources and create new freshwater reserves to increase regional self-sufficiency and reduce dependence on external freshwater supplies. The aims of the applied research project are: a. to investigate which measures actually 'work' in practice and b. to determine whether those measures are economically feasible.	✓			The Netherlands		2012-2017
	Selective Withdrawal at IJmuiden The new shipping lock in IJmuiden will lead to increased salt intrusion into the North Sea Canal and subsequently in the Amsterdam-Rhine Canal. To combat this additional salt intrusion, a selective withdrawal structure will be built that will increase the outflow of saline water from the North Sea Canal. Advanced measurement techniques were applied during physical scale model testing to validate the effectiveness of a salt screen near IJmuiden. These measurements have been used as validation for CFD models, which prove to represent the flow patterns around the salt screen accurately.		✓	✓	The Netherlands	Physical scale model, CFD	2016-present
<project image>	**IJsselmeer** <short project description>				The Netherlands	<method>	<period>
<project image>	**Rijn-Maasmonding** <short project description>				The Netherlands	<method>	<period>

	**Rise and Fall** This project aims to enhance the capabilities of individuals and organisations to develop sustainable strategies for dealing with groundwater extraction, land subsidence and saltwater intrusion in the increasingly urbanising Mekong Delta (Vietnam). We will enlarge the knowledge base of stakeholders (including policy makers, water managers and scientists) and work with them to develop and implement innovative tools and technologies in practice and policy. A new integrated delta model will be developed, linking surface water, groundwater and geo-mechanical models, to analyse the interrelated character of groundwater extraction, subsidence levels and saltwater intrusion.	✓			Vietnam		2014-2018
	**Saline groundwater - surface water interaction in coastal lowlands** Saline groundwater exfiltration is a common problem in the coastal zone of the Netherlands, but the hydrological processes and physiographic factors involved are not fully understood. Research is being conducted to identify the processes and physiographic factors controlling the spatial variability and temporal dynamics of the exfiltration of saline groundwater to surface water, and therefore the contribution of saline groundwater to surface water salinity.	✓	✓		The Netherlands		2010-present
	**Small Island Developing States (SIDS)** Most small islands, such as in the Caribbean or the Pacific but also in Indonesia and the Netherlands often suffer from freshwater security. Surface water resources are limited, and they rely on small precious fresh groundwater lenses which are threatened by coastal erosion and over-exploitation. Deltares studied the dynamics of these fresh groundwater lenses using innovative monitoring techniques and the latest modelling tools.	✓					2015-2017
	Smart freshwater management The practice of 'flushing' presents a large burden on already limited freshwater resources. Notwithstanding, no formal goals or guidelines existed to manage the use of freshwater for flushing. This practice was found to be inefficient in lowering surface water salt concentrations. Together with water users, transparent and achievable goals were derived, and freshwater management was formalised to achieve these goals.	✓			The Netherlands		2015-2017

	SWIBANGLA Bangladesh is densely populated and it is expected that the population increases significantly in the coming decade. Demand for drinking water will increase accordingly. These developments may cause significant changes in the hydrological system, e.g. leading to a drop of groundwater pressures. Moreover, climate change and a sea level rise are predicted by the scenarios drawn by the International Panel of Climate Change (IPCC, 2013). This leads to, among others, an increase of salt water intrusion, in surface water as well as in groundwater. In this project, the focus is on salt water intrusion in coastal groundwater systems, as groundwater is the main resource of drinking water.	✓			Bangladesh		2013-2014
	**Understanding salinisation processes in the Nile Delta** The salinisation of the precious fresh groundwater resources in the Nile Delta due to salt water intrusion and extensive groundwater use is a major concern for Egyptian water users and managers. Groundwater is used for irrigation, industrial and drinking purposes. Sea-level rise and the ongoing increase in the use of groundwater and surface water are expected to have a further negative effect on the groundwater system.	✓			Egypt		2013-2015
	Water Nexus "Salt water where possible, freshwater where necessary." Water Nexus is a 6 million euro NWO-STW research programme that ran from 2015 to 2020, supported by 25 partners from multinational and small/middle sized companies, consultancy firms, research institutes, water boards, and the Ministry of Infrastructure and Environment.	✓			The Netherlands		2015-2020
	Nature Coast The Sand Motor pilot creates a dynamic environment along the coastline of the Netherlands, in which (continuous) changes in the distribution of fresh and salt groundwater take place. Although the magnitude of the spatial and temporal changes in the density of the coastal groundwater is not known beforehand, it creates an ideal circumstance for the advancement of our knowledge on seawater intrusion processes.	✓			The Netherlands		2013-2016