

Hydroinformatik - SoSe 2026

UW-BHW-414-02: Umweltinformatik

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Dresden, 17.04.2026

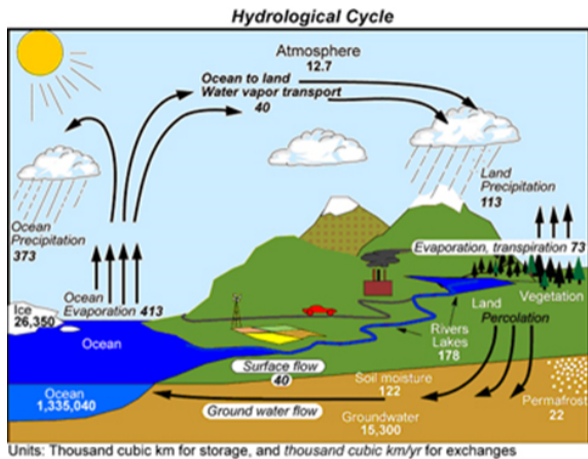
Zeitplan: Hydroinformatik I+II

Sommersemester 2026: Stand: 06.04.2026

Nr.	KW	Datum	ID	Thema
01+02	16	17.04.2026	UW-BHW-414-01/02	Einführung in die Vorlesung, Umweltinformatik
03	16	17.04.2026	UW-BHW-414-03	Werkzeuge, Hello World (in C++)
05	17	24.04.2026	UW-BHW-414-04	Selbststudium: Software-Installationen
07	19	08.05.2026	UW-BHW-414-05	Objekt-Orientierte Programmierung: C++, Klassen
09	20	15.05.2026	UW-BHW-414-E	Python
11	21	22.05.2026	UW-BHW-414-F	Modellierung, Digitalisierung, Wasser 4.0
00	22	29.05.2026		Vorlesungsfreie Woche
13	23	05.06.2026	UW-BHW-414-G	KI, Maschinelles Lernen, Neuronale Netzwerke
15	24	12.06.2026	UW-BHW-414-H	Kontinuumsmechanik, Hydromechanik
17	25	19.06.2026	UW-BHW-414-I	Differentialgleichungen, Näherungsverfahren
19	26	26.06.2026	UW-BHW-414-J	Finite-Differenzen, explizite Verfahren
21	27	03.07.2026	UW-BHW-414-K	Finite-Differenzen, implizite Verfahren
23	28	10.07.2026	UW-BHW-414-L	Gerinnehydraulik, Grundwasserhydraulik
25	29	17.07.2026	UW-BHW-414-M	Grundwasserhydraulik
27	30	24.07.2026	UW-BHW-414-N	Zusammenfassung, Klausurvorbereitung

- 1 UW-BHW-414-02: Umweltinformatik
 - Semesterplan
- 2 Hydrosysteme
- 3 Systemanalyse
- 4 Umweltinformatik
 - Workflows
 - Beispiel: Grundwassermodell Saudi Arabien
- 5 OpenGeoSys

Hydrosystemanalyse



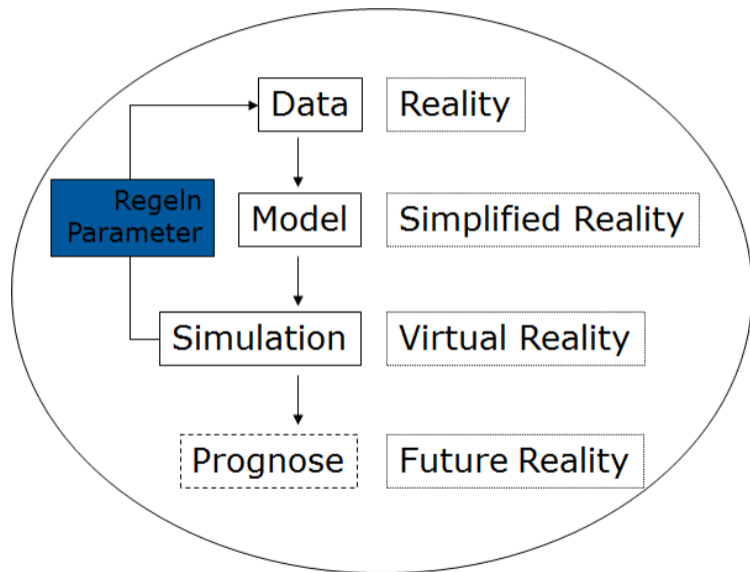
Referenz: Sachse et al. (2014) OGS Tutorial "Computational Hydrology"

Totes Meer (Dead Sea) - Arid



Elbe - Humid





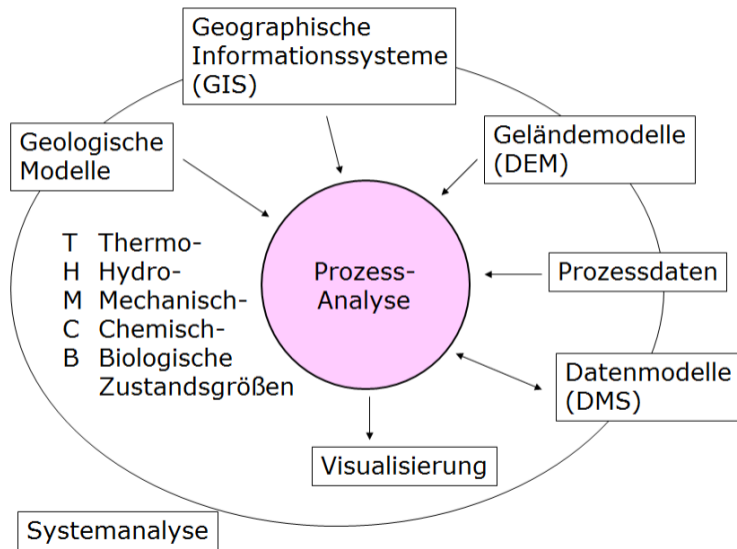
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Kalibrierung →

Verifizierung →

Validierung

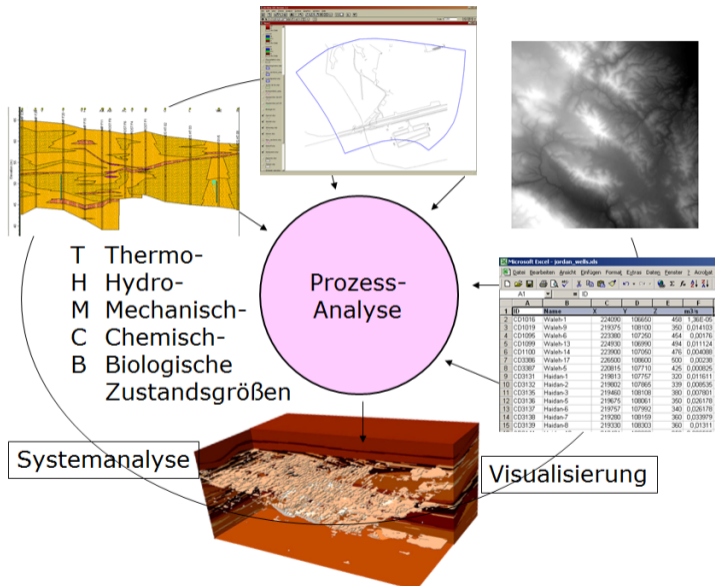
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Systemanalyse



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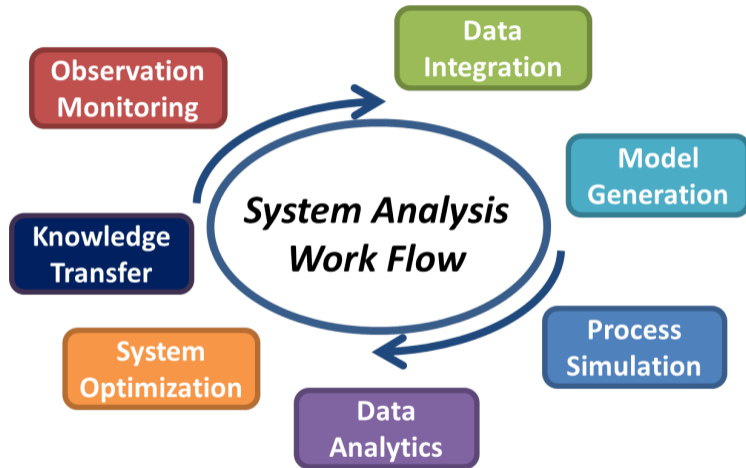
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Umweltinformatik

- Workflows
 - Visualisierung
-

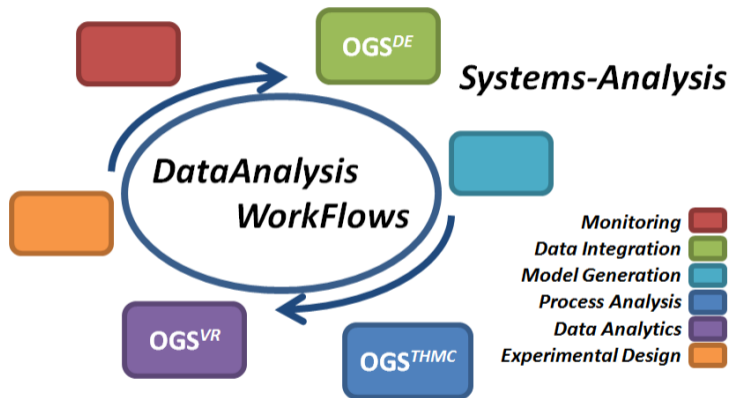
- Big-Data
 - Datenbasierte Methoden (Maschinelles Lernen)
 - ...
-

- Beispiele (Hydrologie, Geotechnik, Geothermie, ...)



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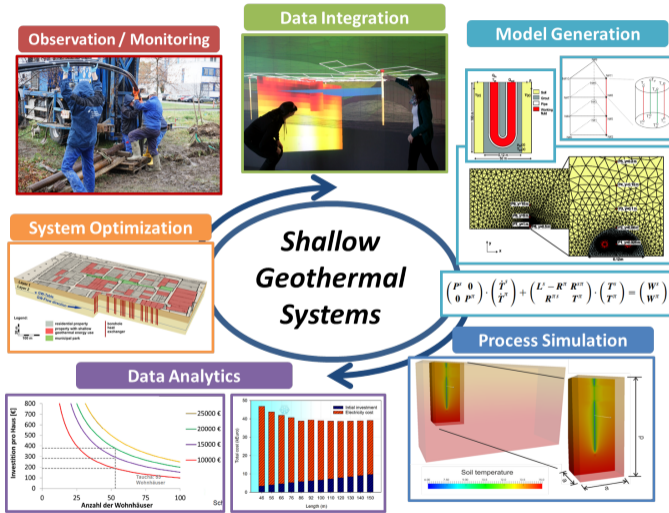
Workflows (Hydrologie)



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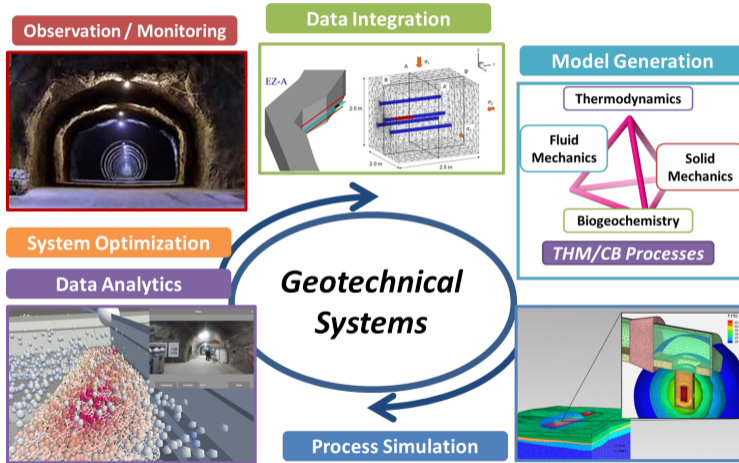
Workflows (Geothermie)



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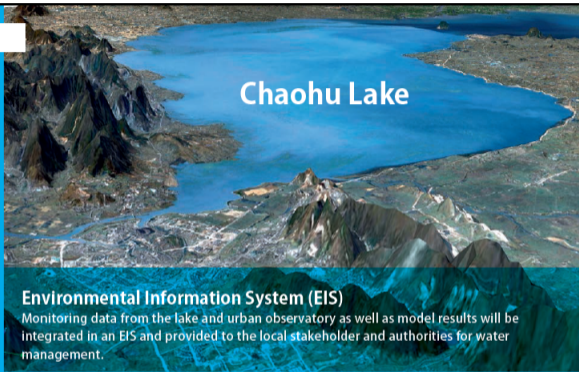
Workflows (Geotechnik)



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OpenGeoSys



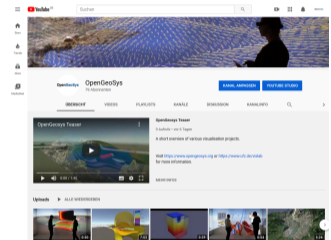
Environmental Information System (EIS)

Monitoring data from the lake and urban observatory as well as model results will be integrated in an EIS and provided to the local stakeholder and authorities for water management.



AL.VIS | TIMESERIES

Urban Catchments Video



Notizen:

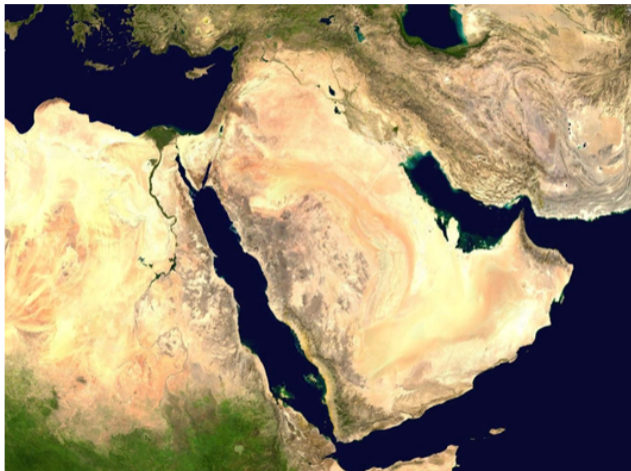
- OGS@YouTube
- ...

Mega-Aquifers: Saudi Arabien



Dornier Consulting

gtz



Mega-Aquifers: Saudi Arabien



Boundary Boreholes Digital elevation model

Imported objects (Boreholes)

Visualised Objects

Visualisation Properties

Precipitation event

Details for selected Borehole

Time series data for hydraulic head

Qt

OpenGeoSys Data Explorer - 5.0.090(KR/TF/LB) - FirstFloor

Stations

Station Name	x	y
Boreholes		
Ushaylah 1	69390...	24727...
WA 1897	77114...	22708...
WA 627	88931...	28648...
WUTaYD-WW1	11165...	26586...
WUTaYD-WW2	11161...	26580...
WW1-A	82675...	23367...
Zayman	10244...	22957...
4-HE-69	64594...	31134...
4-5-100	87917...	27662...
4-5-104	93857...	26486...
4-5-105	88333...	25040...
4-5-106	77526...	23359...
4-5-73	88500...	28722...
4-5-75	88666...	28942...
4-5-80	80924...	20563...
4-5-81	79829...	20648...
4-5-82	78426...	20867...
4-5-86	86043...	26789...
4-5-91	95750...	24954...
4-5-93	99167...	25940...
4-5-99	83750...	23810...
6.2.A	92802...	23522...
7-5-21	99305...	20518...
7-5-50	72405...	20249...

Visualization Pipeline

Object name Visib

- SaudiArabiaDEM.asc
- #3042_rainfieldmovie_1_utm38n.asc
- Image to bar chart
- system_boundary_proj
- #system_boundary_proj
- Lines to tubes
- Boreholes
- PrecipitationMovie

Actor Properties

Diffuse Color (57, 219, 255)

Visible Edges (0, 0, 0)

Opacity

Scaling Factor 1

Filter Properties

PhiResolution 5

Radius 6000

ScaleFactor 1

ScaleMode 0

ThetaResolution 5

VectorMode 0

Borehole "4-S-80"
Depth: 633m

7	249.52
8	65.8
9	112.46
5	263.46
4	461.46

Time series data for hydraulic head

Ground Water Level Station

01.01.2002 20.02.2002 11.04.2002 31.05.2002 30.07.2002 08.09.2002 28.10.2002 17.12.2002 05.02.2003

Time

day

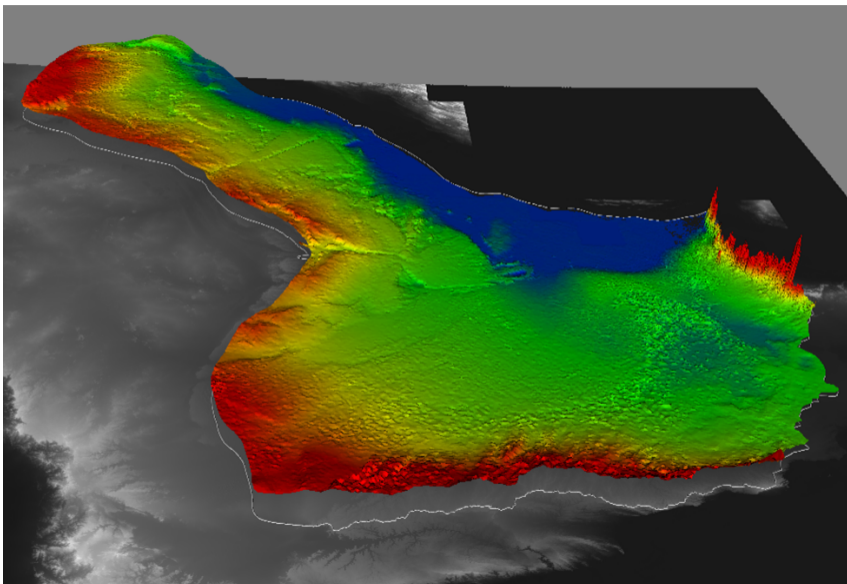
0 2 4 6 8 10 12 14

14

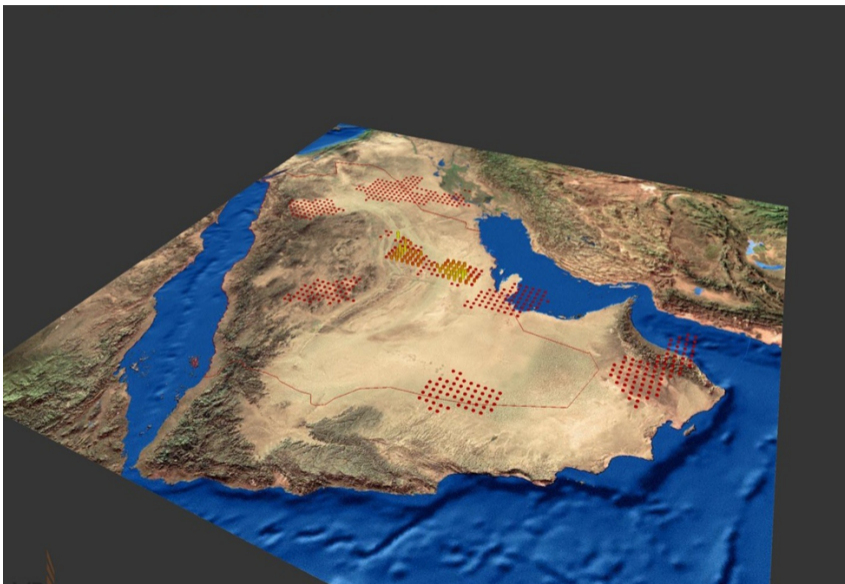
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Ground Water Level Station

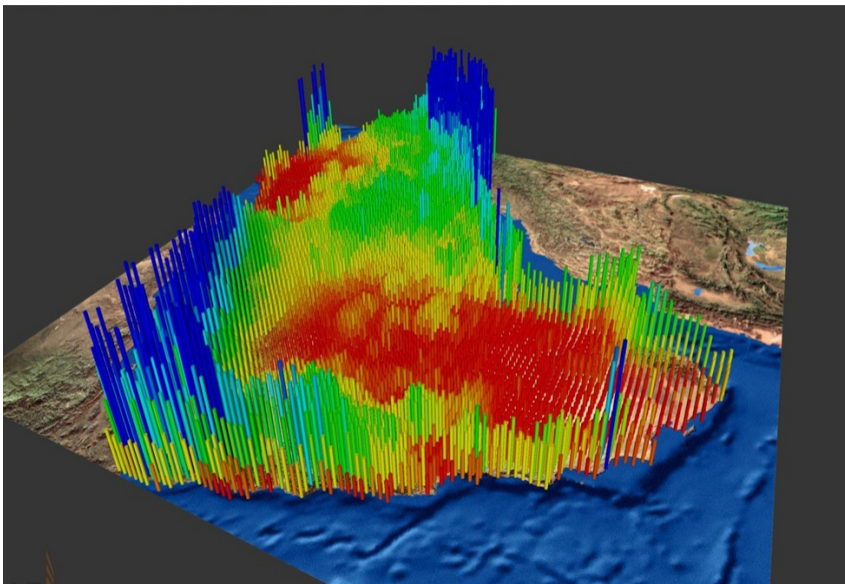
OpenGeoSys

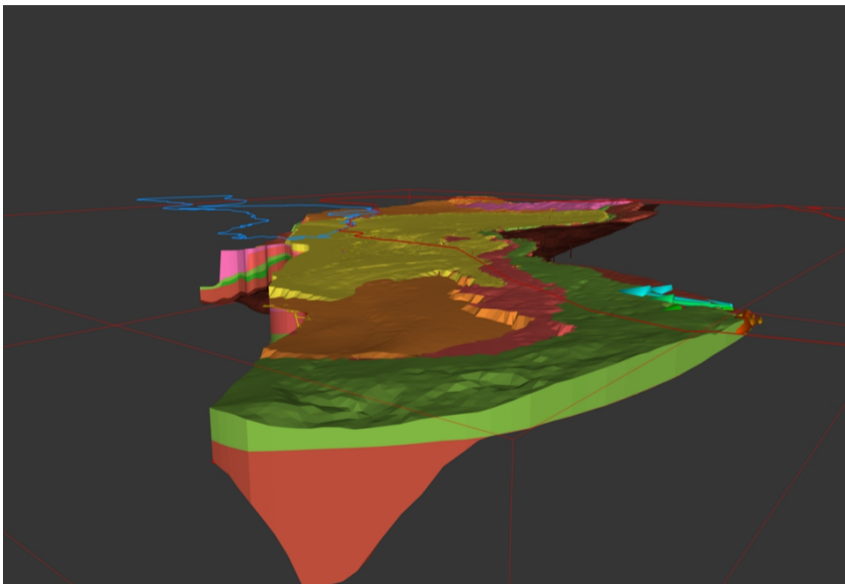


Mega-Aquifers: Saudi Arabien

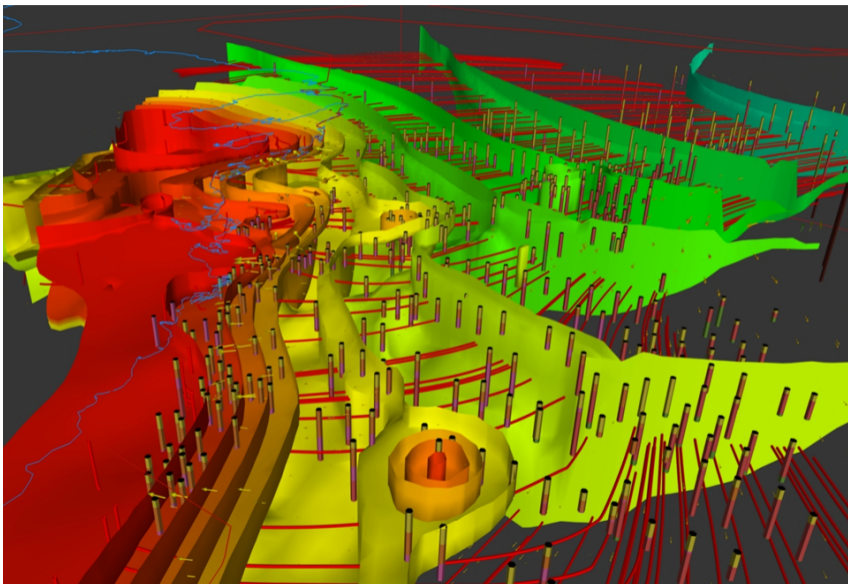


Mega-Aquifers: Saudi Arabien





Mega-Aquifers: Saudi Arabien



YouTube DE Suchen

Start Trends Abos Mediathek

OpenGeoSys OpenGeoSys 79 Abonnenten

KANAL ANPASSEN YOUTUBE STUDIO

ÜBERSICHT VIDEOS PLAYLISTS KANÄLE DISKUSSION KANALINFO

OpenGeosys Teaser

OpenGeosys Teaser

9 Aufrufe · vor 6 Tagen

A short overview of various visualisation projects.

Visit <https://www.opengeosys.org> or <https://www.ufz.de/vislab> for more information.

MEHR INFOS

Uploads ▶ ALLE WIEDERGEHEN

0:50 7:53 0:39 0:54 5:26

Saudi Arabia Video

OpenGeoSys
workflows

Notizen:

■ ...

https:
//www.youtube.com/
user/OpenGeoSys

Hydroinformatik (Lehrinhalte)

- 1 Grundlagen der objekt-orientierten Programmierung (C++)
- 2 Grundlagen der hydrologischen Modellierung
- 3 Entwicklung von Workflows mit Python und Jupyter Notebooks

Methoden

- ▶ Netzwerk-Modelle (ANN, Bayessche Netze)
- ▶ Konzeptionelle Modelle (HRU ...)
- ▶ Numerische Methoden (prozess-basierte, Mehrfeldproblemen ...)
- ▶ Lösen von partiellen Differenzialgleichung (Stofftransport und Hydraulik)