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Launching Workshop
SNOW FLOW PROJECT
Study case of mountainous springs Assal and Laban

October 2020

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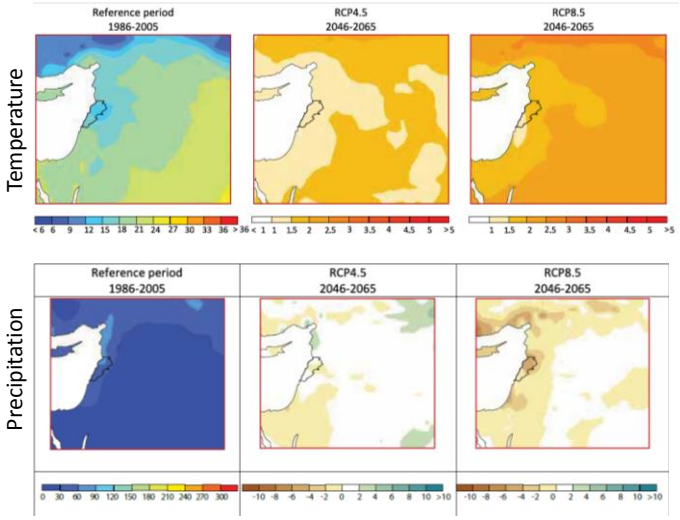
Assessment of the impact of Climate Change on Water Resources in the Arab Region (RICCAR)

- Reduction of 40% of snow cover with an increase of 2C
- Decrease in snow residence time from 110 to 45 days with a earlier melting
- Drought will occur up to 30 days earlier (Bekka, Hermel and south) by 2040
- Negative impact on rivers and groundwater recharge that will exacerbate the existing challenge to water availability especially during summer season



Source: MoE/UNDP/GFE (2016). Lebanon's Third National communication of the United Nation Framework Convention on Climate Change. Beirut, Lebanon

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Economic and environmental costs on water scarcity and natural disaster from climate change (2015 USD)

Reduction in exploitable water supply per year in Lebanon	2020	2040	2080
Percent	1	8	29
Volume (million cubic meters per year)	20	160	580
Cost per year to replace the water lost in Lebanon			
Total (millions)	USD 21	USD 320	USD 1,200
Households (millions)	USD 12	USD 190	USD 720
Government (millions)	USD 8	USD 130	USD 480
Potential costs to Lebanon from climate-related natural disasters			
Total cost of damage from natural disasters in Lebanon, including droughts, floods, landslides, and storms (millions)	USD 2	USD 35	USD 1,600

Source: MoE/UNDP/GFE (2016). Lebanon's Third National communication of the United Nation Framework Convention on Climate Change. Beirut, Lebanon

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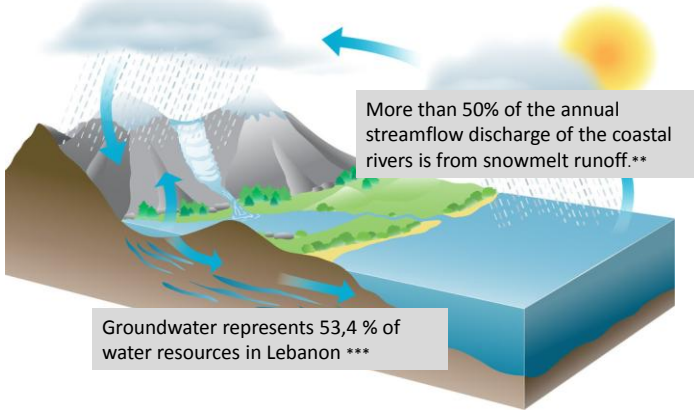
Challenges for Water Resources Management: How to deal with uncertainties ?

National Water Sector Strategy 2020:

Implement an adequate coverage of Lebanese territory with meteorological and hydrometric network

Carry out comprehensive geological and hydrogeological studies of Lebanese territory to assess the groundwater capacities

Snow contribution of groundwater recharge can reach up to 75% in the upper mountainous aquifers.*



*Snow observations in Mount Lebanon 2011-2016, A.Fayad, S. Gascoin, G. Faour, P. Fanise, L. Drapeau, J. Somma, A. Fadel, A. Al Bitar, R. Escadafal 2017
**A. Hreiche, W. Najem, C. Bocquillon (2007) Hydrological impact simulations of climate change on Lebanese coastal rivers, Hydrological Sciences Journal
***MoEW, National Water Sector Strategy Update – 2020, volume III Eater Resources Management

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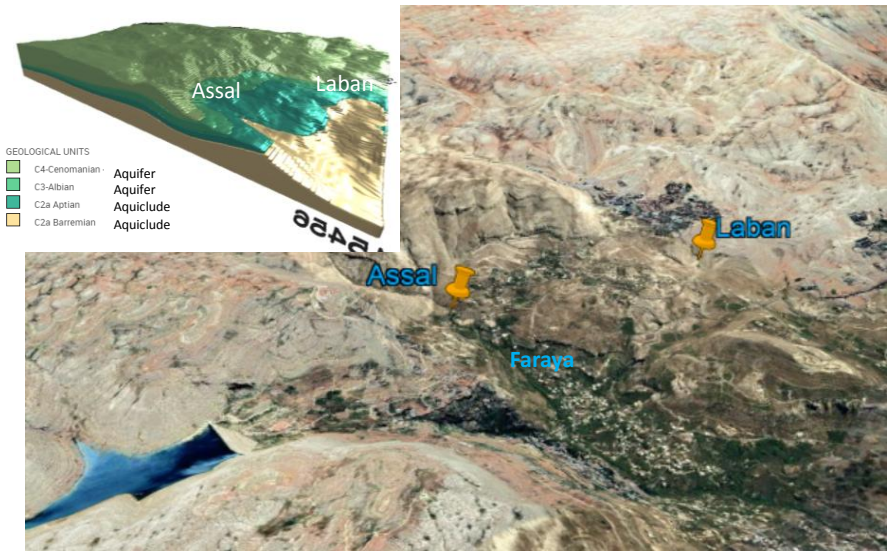
Study case mountainous spring feeding Assal and Laban (Jeita catchment area)

Assal spring:
Elevation 1540 m
Discharge 0.2-2.5 m3/s
Yearly Volume 22-30 Mm3
Laban spring:
Elevation 1644 m
Yearly Volume: 15 Mm3
Two thirds used to fill Chabrouh dam during snowmelt
Both springs provide water for irrigation and domestic use for the districts of
Kfar Debbian, Bqaatouta Boqaata,Faraya, Hrajel, Mayroubq



Source: CDR, BGR May 2013 Protection of Jeita Spring – Monitoring of spring discharge and surface water runoff in the GW contribution zone of Jeita spring

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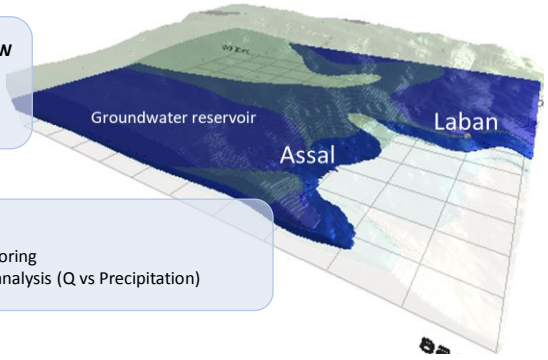
Partners and Activities

- Multi-disciplinary experts team
- working on several components of water cycle
- Using complementary methodologies

USJ O-life: snow research activities
- Measurement of rainfall/ETP
- Calculation of snow volume and its water equivalent
- Characterization of geomorphology (using drone and satellite images)

AUB: Subsurface characterization and GW flow conceptualization
- Geological mapping
- Hydrogeological field investigation



AUB USJ – Assessment of GW availability:
- Water Balance
- Conceptual model

AUB USJ: surface water
- Spring discharges monitoring
- Time series correlative analysis (Q vs Precipitation)

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Project impact and importance: future works

Discussion, Q&A: concerns and Expectations