**Student ID:** 21141058
**Student Name:** Mohammad Omar Raihan
**Course Code:** CSE424
**Section:** 01

**Review:** Remote Sensing of Floodwater-Induced Subsurface Halite Dissolution in a Salt Karst System, with Implications for Landscape Evolution: The Western Shores of the Dead Sea.

**URL:** https://www.mdpi.com/2072-4292/16/17/3294

**Summary:**

**Hypothesis:** This research examines the connection between landscape change in salt karst systems and floodwater-induced subsurface halite dissolution, with a specific focus on the western beaches of the Dead Sea. Understanding how floodwaters contribute to subsurface dissolution processes that result in sinkhole formation and landscape alterations is the goal of the study. This understanding is essential for forecasting future landscape development and evaluating sinkhole threats.

**Contribution:** By capturing the real-time interactions between surface water and subsurface halite dissolution, the work advances our understanding of flood-induced subsurface processes. It presents thorough observations of sinkhole development and subsidence in the Ze'elim and Hever alluvial fans and emphasizes the role that flash floods play in hastening the creation of karst. The paper also presents a novel approach of monitoring these processes that combines drone photography, LiDAR, and InSAR.

**Methodologies:** The research makes use of drone photography for high-resolution imaging, interferometric synthetic aperture radar (InSAR) for detecting ground subsidence, and light detection and ranging (LiDAR) for creating Digital Surface Models (DSMs). Additionally, time-lapse cameras (TLCs) were used to record the interactions between sinkholes and floodwater in real time. Hydrometers were also used to gauge the amount of floodwater across overpasses. Using these techniques, the researchers were able to track the construction of subsurface dissolution channels, patterns of subsidence, and changes in the landscape over a twelve-year period.

**Conclusion:** The study comes to the conclusion that the Dead Sea region's terrain is significantly shaped by floodwater-induced subsurface halite breakdown. The results highlight how crucial it is to comprehend these mechanisms in order to manage sinkhole risks and forecast changes in the terrain in the future. The study highlights the necessity of continued monitoring by showing how ongoing subsurface dissolution can result in significant surface subsidence and landscape modification.

**Limitations:**

**1.** Due to the intricacy of the subsurface channels, one drawback of the study is the inability to precisely determine the temporal correlations between subsurface disintegration and the surface manifestations. This makes it more difficult to fully comprehend the scope and timing of the subsurface activities.

**2.** The research is constrained by its dependence on remote sensing methods, which, despite their advancements, might not fully capture the intricacies of subsurface details, thereby resulting in an underestimate of subsurface disintegration and its effects on the terrain.

**3.** The study's geographic focus on the western Dead Sea coasts may limit the findings' applicability to other karst places with distinct hydrological or geological circumstances.

**Synthesis:**

**1.** Building predictive models for sinkhole development using the real-time data gathered in this study could be the main goal of a future investigation. These models have the potential to enhance hazard assessment and landscape management in karst zones through the integration of hydrological, geological, and remote sensing data.

**2.** Another extension of this research could involve applying similar methodologies to other karst regions worldwide, comparing the processes observed in the Dead Sea with those in different environments. This could help in understanding the global applicability of the findings and the variability of karst processes under different climatic and geological conditions.