1. **What difficulties does the old paradigm of the hypothesis test encounter?**

i:The difficulty to do controlled experiments/group the observations based on controlled variables, especially when the studied ecological system/phenomenon spans vast space and time .

ii: The difficulty of formulating a testable null hypothesis/H0 might even not exist.

iii: Unable to reveal the complex, often highly non-linear interactions between a large number of variables, the result is the increase in p-value and loss in correlation despite the increasing observations/experiments.

iv: inherently limited data collection space/time span, and the lack of appropriate tools used for thorough processing large amount of accumulated data.

1. **What advances does the paradigm of data science used for ecological data?**

Advances of data driven science used for ecological research:

i:access in species occurrence data and environmental feature data.

ii: Wast array of environmental sensor networks providing multimodal data.

iii: Establishments of ecological databases, and the accumulation of data within them

iv: The use of machine learning, clustering algorithms and deep learning to build more sophisticated models of the data.

Advantages of data driven science used in ecological research:

i: Non-linear, non-gaussian correlation analysis tools to reveal more intricate patterns in the data.

ii: The involvement of every acquired data leads to complete induction of the data, ie sample=population, avoiding misidentifying causality from correlation, a major problem of experience driven science.

iii: A composite paradigm of data driven and hypothesis driven science avoids induction bias associated with the latter one alone.

iv: With large array of data and various machine learning/clustering/correlation analysis tools, pattern can arise from data itself, therefore, there is no need for pre-formulating hypothesis when doing so is hard or impossible. Weak patterns that would otherwise be neglected can also be revealed.