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Identifying Heritage Sites using Data Fusion on Location of Spiritual Sites and Geodata: A Case Study of Archeological Investigations in Brunei Darussalam

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Human civilization and culture on Borneo had generally developed in strong spatial relationship with rivers. Borneo rivers, almost constantly filled in by heavy tropical rains, were ideal topographic features for humans to build their dwellings over and along their banks. Also, as the rivers were full of fish and the banks rich in sago palms and animals, they provided a diversified livelihood for the population limiting agricultural activities. The rivers were also almost exclusive means of transportation to support the trade. These spatial constraints successfully harnessed by the Borneo population ensured the size of the human footprint remained small, thus maintaining the pristine forests with only a very limited space taken up by human settlements. Construction materials for houses were exclusively forest products, which tend to decay quickly because of the high humidity and air temperature. The only durable remains of abandoned human settlements are pottery, clay deposits, some stone and metal objects brought from the North, e.g., China. Therefore, the quest to uncover the cultural heritage of Brunei Darussalam is an extremely challenging one. In this contribution, we report on an attempt to use remote sensing and geoinformation to identify the most likely locations of long-abandoned human settlements. An initial data set is the location of cemeteries and mosques. Besides, topographic data, including LiDAR data, the location of rivers and ponds, abandoned rice fields, landslides, secondary forest plots, historical records, are utilized. Developed maps from this geodata will support possible subsequent archaeological investigations by helping to identify the location of sites of interests. The outcomes of this project may be of interest not only to government departments in charge of the historical and cultural heritage of Brunei Darussalam but also to ecologists documenting the interactions between human civilization and nature.