

# 國立彰化師範大學 96 學年度博士班招生考試試題

系所：地理學系

科目：地理學論著評讀

☆☆請在答案紙上作答☆☆

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1. Please choose two questions as shown below and give your comments. Each answer is 50 scores.
2. If you answer more than two questions, then only the first two written answers will be calculated.

## Question 1

Data resource : Nathan W. Harkins, David J. Anastasio, Frank J. Pazzaglia, 2005, Tectonic geomorphology of the Red Rock fault, insights into segmentation and landscape evolution of a developing range front normal fault, Journal of Structure Geology 27, 1925-1939.

Topographic and geologic features commonly used to delineate fault segmentation record displacement over diverse temporal and spatial scales. The relative sensitivity of these features is determined from the segmentation records preserved by relative and absolute dating of landforms. The concordance of segmentation records preserved in alluvial fans and channel profiles imply that fluvial systems have the ability to respond rapidly ( 1000-100000yrs ) to a base level fall resulting from a fault offset. Initially this occurs through channel incision and followed later by slower processes that affect planimetric basin metrics such as stream capture.

## Question 2

Please read the following paragraphs and give your comments.

The THSR (Taiwan High-Speed Railway) system is about to commence service by the end of 2006. It will not only reduce the travel time to 90 minutes between Taipei and Kaohsiung, but also have impacts on the regional development around the island. However, according to the relative researches, the issue that whether the HSR system improves the equilibrium development among regions or not still lacks consensus. Therefore, the purpose of this research is to discuss this issue, and define the regional development as the increment of population and labors of each city.

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This research established a multi-equation model including demography, labor, land use, and transportation, the output were next stage's population, and manufacturing and service industry labors to evaluate regional development. The results are as follows:

1. the significant factors to the population are manufacturing industry labors, service industry labors, lagged size of habitant area and accessibility.
2. the significant factors to the manufacturing industry labors are lagged manufacturing industry labors and accessibility.
3. the significant factors to the service industry labors are lagged service industry labors, lagged size of commercial area and accessibility.

The simulation approach gives the result of the following: five years from now, with the continuous operation of the THSR system, it indeed narrows the development gap among regions in west Taiwan, while the well-developed cities transfer its resources to the less-developed cities. However, the THSR has no influence on the east side of the island. To solve the inequality problem between both sides, it still needs additional efforts from the government.

### Question 3

Data resource : Robert C. Levy, Rachel T. Pinker, 2007, Remote sensing of spectral aerosol properties - A classroom experience, Bulletin of the American meteorological society 88 (1): 25.

The direct and indirect radiative effects of aerosols on climate and climate change remain a source of uncertainty in climate research. Aerosols play an important role in precipitation processes, reduced visibility, and human morbidity. Before the satellite era, information on aerosols came from limited surface-based observations, which are not sufficient to describe their spatial and temporal variability.

With their vantage high above the Earth, satellite observations of reflected and emitted radiances are

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increasingly being used to monitor aerosols and their interactions within the climate system. A highly successful project is the National Aeronautics and Space Administration's Moderate Resolution Imaging Spectrometer, which has been observing from aboard the Terra and Aqua satellite platforms. By observing spectral radiances in 36 channels (from 0.412 to 14.2  $\mu\text{m}$ ) and at resolutions ranging from 250 m to 1 km, MODIS is highly suitable for deriving aerosol properties over the oceans. The MODIS polar geosynchronous orbit is such that most of the globe is covered each day and completely covered every two days, thus providing comprehensive observations. Because the MODIS data are well characterized and easy to access, they are suitable for introducing students to the physics of remote sensing of aerosols.

As part of a graduate course in remote sensing, students used MODIS data and focused on the following: understanding how aerosols interact with reflected solar radiation, obtaining a working knowledge of inversion techniques for retrieving aerosol properties over oceans, implementing the MODIS algorithm to retrieve aerosol properties from observations, contrasting aerosol properties from different sites and relating them to geography and season, and evaluating satellite retrievals in the context of ground-based aerosol measurements.

## **Question 4**

Pickett and Cadenasso (1995) in a Science article provided the following statements:

“Landscape ecology is the study of the reciprocal effects of spatial pattern on ecological processes; it promotes the development of models and theories of spatial relationship, the collection of new types of data on spatial pattern and dynamics, and the examination of spatial scales rarely addressed in ecology.”

Based on the above statement, in your opinions how can trainings in geography help the development of landscape ecology?

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## Question 5

Please read the following paragraphs in “Next climate change report spells out effects of global warming” (IPCC, 2007) and give your comments.

The report includes these likely results of global warming:

Hundreds of millions of Africans and tens of millions of Latin Americans who now have water will be short of it in less than 20 years. By 2050, more than one billion people in Asia could face water shortages. By 2080, water shortages could threaten 1.1 billion to 3.2 billion people, depending on the level of greenhouse gases that cars and industry spew into the air.

Death rates for the world's poor from global-warming-related illnesses, like malnutrition and diarrhea, will rise by 2030. Malaria and dengue fever, as well as illnesses from eating contaminated shellfish, are likely to grow.

Europe's small glaciers will disappear, with many of its large glaciers shrinking dramatically by 2050. And half of Europe's plant species could be vulnerable, endangered or extinct by 2100.

By 2080, between 200 million and 600 million people could be hungry because of global warming's effects. About 100 million people a year could be flooded by 2080 by rising seas. Smog in U.S. cities will worsen and "ozone-related deaths from climate increase by approximately 4.5 percent for the mid-2050s, compared with 1990s levels," turning a small health risk into a substantial one.