

Geomorphology Lab: Introduction to Aerial Photography

Student Lab Equipment and Methods for Air Photo Viewing

- a. We have two sets of air photos available for student use in this class.

Crystal Productions Air Photo Set 1 (3 packages of each)

Crystal Productions Air Photo Set 2 (4 packages of each)

NOTE: Students are responsible for keeping the air photo sets organized throughout the term. If you move or use a particular air photo, make sure it returns to the proper place so the next person can find it.

- b. We also have two different types of stereoscopes:
 - i. Mirrored "Geoscopes": the 4 large viewers

Hint for using Geoscopes for stereo viewing:

- find the common or overlap area of each photo pair

- place each photo pair directly beneath the mirrors, with the "overlap" or common area toward the center of the scope.

- Align the photos by looking through the small mirrors and move the photos until a common point of each photo merges together

- view the photos through the lens attachment, adjust / rotate the photos as necessary until common points merge, and 3-d view is obtained (this may take a minute or so for your eyes to adjust to the viewer)

- ii. Pocket Stereoscopes: a dozen or so of the plastic "stereo glasses"

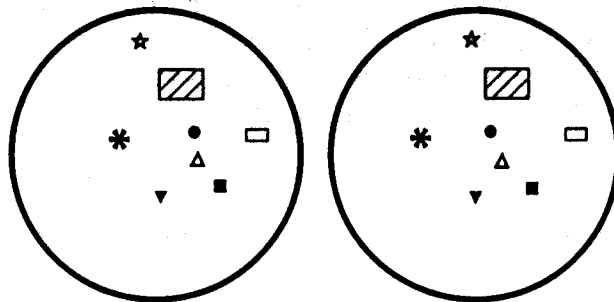
Hint for using pocket stereoscopes for viewing:

- find the common or overlap area of each photo pair

- place the pocket stereoscope over a stereo pair, with the centers of each lense over a common point.

- rotate and move the stereoscope slightly until 3-D viewing is obtained (note: you may need to adjust the lense width or "interpupillary" distance for your specific eyes)

1. Test of stereo vision. Use the pocket stereoscopes to view the left and right images in Figure A. Rank the shapes according to apparent height (1 = highest; 8 = lowest). Create a legend to the right of the diagram, with your ranking.



A. Left and right images.

2. Air photos were obtained from an aircraft with an average camera altitude of 3050 m above the earth's surface. The lense has a focal length of 152 mm. What is the scale of the photographs? Round to the nearest whole number. Show all of your math work.
3. A photograph has a scale of 1:10,000 and the camera focal length was 152 mm. A cliff face is measured on the photograph with the following data:
 Distance of cliff from principal point = 3.1 inches (as measured on the photo)
 Apparent height of cliff = 0.49 inches (as measured on the photo)

What is the actual height of the cliff face in meters? How about feet? (Show all your math work)

4. A standard air photo frame is 9 inches x 9 inches in area. If a standard air photo has a scale of 1:63,360, using a 152 mm lense:
 A) What will be the actual land area covered in square feet? how about square kilometers?
 B) What altitude will the aircraft have to fly at to produce these images? (show all math work)

5. Pick at least one stereo-photo pair each from: Crystal Set 1, Crystal Set 2, and the Aerial Stereo Photograph book. Make sure you can see in 3-D using the mirrored geoscopes and pocket stereoscopes.

Now try seeing in 3-D without the stereoscopes. Use the Meteor Crater example on p. 58 of the Aerial Stereo Photograph book. This is similar to "magic eye" 3-D picture viewing. Center each eye over the crater on each photo pair. Try holding the book upright in front of your face; start out close to your eyes and slowly move the photos away until the two separate left-right photos "dissolve" into a third photo in the center... see if you can get the apparent third photo to appear in 3-D.

Now try seeing 3D images in "Figure A" of question 1, without using the stereoscope.

List and discuss any difficulties you have in using the stereoscopes or with stereoscopic vision.

6. Use either the mirrored geoscopes or pocket stereoscopes to make landscape observations about the following photographs:

Crystal Set 1 Photos 2LR, 4LR, 5LR, 9LR, 12LR, 15LR, and 17LR

Crystal Set 2 Photos 10AB, 13AB, 18AB, 19AB, and 20AB

Use the observation check lists on the pages that follow to guide you through the observation process.

Air Photo Data Sheet

Air Photo I.D. _____

Choose one or more of all observations that apply.

1. General landscape patterns (linear, dendritic, radiating, parallel, circular, undulating, non-descript, other-explain):

2. General landscape relief (low, medium, high):

3. Overall hillslope gradients (gentle, moderate, steep):

4. Vegetative Cover (non-existent, sparse, moderate, dense, other-explain):

5. Vegetative Type (grasses, shrubs, trees, other-explain):

6. Climate (humid, semi-arid, arid, other-explain):

7. Human Land-use (agricultural-grazing, agricultural-crops, residential, urban, industrial, forestry, mining, other-explain):

8. Dominant landforms (hillslopes, river channels, floodplains/terraces, alluvial fans, glacial valley, glacial moraine, alpine glacial features, continental glacial features, dunes, playa lakes, volcanic landforms, lava flows, coastal terraces, coastal landforms, other-explain)

9. Primary geomorphic agents (more than one possible: wind, water-fluvial, water-lacustrine, water-marine, ice-alpine glaciation, ice-continental glaciation, gravity-landslides, gravity-mass wasting/general, tectonics-uplift, tectonics-subsidence, tectonics-volcanism, other-explain):

11. Timing of dominant landscape-forming processes (present-day / ongoing, recent past, distant past, not evident, other-explain):

Air Photo Data Sheet

Air Photo I.D. _____

Choose one or more of all observations that apply.

1. General landscape patterns (linear, dendritic, radiating, parallel, circular, undulating, non-descript, other-explain):

2. General landscape relief (low, medium, high):

3. Overall hillslope gradients (gentle, moderate, steep):

4. Vegetative Cover (non-existent, sparse, moderate, dense, other-explain):

5. Vegetative Type (grasses, shrubs, trees, other-explain):

6. Climate (humid, semi-arid, arid, other-explain):

7. Human Land-use (agricultural-grazing, agricultural-crops, residential, urban, industrial, forestry, mining, other-explain):

8. Dominant landforms (hillslopes, river channels, floodplains/terraces, alluvial fans, glacial valley, glacial moraine, alpine glacial features, continental glacial features, dunes, playa lakes, volcanic landforms, lava flows, coastal terraces, coastal landforms, other-explain)

9. Primary geomorphic agents (more than one possible: wind, water-fluvial, water-lacustrine, water-marine, ice-alpine glaciation, ice-continental glaciation, gravity-landslides, gravity-mass wasting/general, tectonics-uplift, tectonics-subsidence, tectonics-volcanism, other-explain):

11. Timing of dominant landscape-forming processes (present-day / ongoing, recent past, distant past, not evident, other-explain):

Air Photo Data Sheet

Air Photo I.D. _____

Choose one or more of all observations that apply.

1. General landscape patterns (linear, dendritic, radiating, parallel, circular, undulating, non-descript, other-explain):

2. General landscape relief (low, medium, high):

3. Overall hillslope gradients (gentle, moderate, steep):

4. Vegetative Cover (non-existent, sparse, moderate, dense, other-explain):

5. Vegetative Type (grasses, shrubs, trees, other-explain):

6. Climate (humid, semi-arid, arid, other-explain):

7. Human Land-use (agricultural-grazing, agricultural-crops, residential, urban, industrial, forestry, mining, other-explain):

8. Dominant landforms (hillslopes, river channels, floodplains/terraces, alluvial fans, glacial valley, glacial moraine, alpine glacial features, continental glacial features, dunes, playa lakes, volcanic landforms, lava flows, coastal terraces, coastal landforms, other-explain)

9. Primary geomorphic agents (more than one possible: wind, water-fluvial, water-lacustrine, water-marine, ice-alpine glaciation, ice-continental glaciation, gravity-landslides, gravity-mass wasting/general, tectonics-uplift, tectonics-subsidence, tectonics-volcanism, other-explain):

11. Timing of dominant landscape-forming processes (present-day / ongoing, recent past, distant past, not evident, other-explain):

Air Photo Data Sheet

Air Photo I.D. _____

Choose one or more of all observations that apply.

1. General landscape patterns (linear, dendritic, radiating, parallel, circular, undulating, non-descript, other-explain):

2. General landscape relief (low, medium, high):

3. Overall hillslope gradients (gentle, moderate, steep):

4. Vegetative Cover (non-existent, sparse, moderate, dense, other-explain):

5. Vegetative Type (grasses, shrubs, trees, other-explain):

6. Climate (humid, semi-arid, arid, other-explain):

7. Human Land-use (agricultural-grazing, agricultural-crops, residential, urban, industrial, forestry, mining, other-explain):

8. Dominant landforms (hillslopes, river channels, floodplains/terraces, alluvial fans, glacial valley, glacial moraine, alpine glacial features, continental glacial features, dunes, playa lakes, volcanic landforms, lava flows, coastal terraces, coastal landforms, other-explain)

9. Primary geomorphic agents (more than one possible: wind, water-fluvial, water-lacustrine, water-marine, ice-alpine glaciation, ice-continental glaciation, gravity-landslides, gravity-mass wasting/general, tectonics-uplift, tectonics-subsidence, tectonics-volcanism, other-explain):

11. Timing of dominant landscape-forming processes (present-day / ongoing, recent past, distant past, not evident, other-explain):

Air Photo Data Sheet

Air Photo I.D. _____

Choose one or more of all observations that apply.

1. General landscape patterns (linear, dendritic, radiating, parallel, circular, undulating, non-descript, other-explain):

2. General landscape relief (low, medium, high):

3. Overall hillslope gradients (gentle, moderate, steep):

4. Vegetative Cover (non-existent, sparse, moderate, dense, other-explain):

5. Vegetative Type (grasses, shrubs, trees, other-explain):

6. Climate (humid, semi-arid, arid, other-explain):

7. Human Land-use (agricultural-grazing, agricultural-crops, residential, urban, industrial, forestry, mining, other-explain):

8. Dominant landforms (hillslopes, river channels, floodplains/terraces, alluvial fans, glacial valley, glacial moraine, alpine glacial features, continental glacial features, dunes, playa lakes, volcanic landforms, lava flows, coastal terraces, coastal landforms, other-explain)

9. Primary geomorphic agents (more than one possible: wind, water-fluvial, water-lacustrine, water-marine, ice-alpine glaciation, ice-continental glaciation, gravity-landslides, gravity-mass wasting/general, tectonics-uplift, tectonics-subsidence, tectonics-volcanism, other-explain):

11. Timing of dominant landscape-forming processes (present-day / ongoing, recent past, distant past, not evident, other-explain):

Air Photo Data Sheet

Air Photo I.D. _____

Choose one or more of all observations that apply.

1. General landscape patterns (linear, dendritic, radiating, parallel, circular, undulating, non-descript, other-explain):

2. General landscape relief (low, medium, high):

3. Overall hillslope gradients (gentle, moderate, steep):

4. Vegetative Cover (non-existent, sparse, moderate, dense, other-explain):

5. Vegetative Type (grasses, shrubs, trees, other-explain):

6. Climate (humid, semi-arid, arid, other-explain):

7. Human Land-use (agricultural-grazing, agricultural-crops, residential, urban, industrial, forestry, mining, other-explain):

8. Dominant landforms (hillslopes, river channels, floodplains/terraces, alluvial fans, glacial valley, glacial moraine, alpine glacial features, continental glacial features, dunes, playa lakes, volcanic landforms, lava flows, coastal terraces, coastal landforms, other-explain)

9. Primary geomorphic agents (more than one possible: wind, water-fluvial, water-lacustrine, water-marine, ice-alpine glaciation, ice-continental glaciation, gravity-landslides, gravity-mass wasting/general, tectonics-uplift, tectonics-subsidence, tectonics-volcanism, other-explain):

11. Timing of dominant landscape-forming processes (present-day / ongoing, recent past, distant past, not evident, other-explain):

Air Photo Data Sheet

Air Photo I.D. _____ Choose one or more of all observations that apply.

1. General landscape patterns (linear, dendritic, radiating, parallel, circular, undulating, non-descript, other-explain):

2. General landscape relief (low, medium, high):

3. Overall hillslope gradients (gentle, moderate, steep):

4. Vegetative Cover (non-existent, sparse, moderate, dense, other-explain):

5. Vegetative Type (grasses, shrubs, trees, other-explain):

6. Climate (humid, semi-arid, arid, other-explain):

7. Human Land-use (agricultural-grazing, agricultural-crops, residential, urban, industrial, forestry, mining, other-explain):

8. Dominant landforms (hillslopes, river channels, floodplains/terraces, alluvial fans, glacial valley, glacial moraine, alpine glacial features, continental glacial features, dunes, playa lakes, volcanic landforms, lava flows, coastal terraces, coastal landforms, other-explain)

9. Primary geomorphic agents (more than one possible: wind, water-fluvial, water-lacustrine, water-marine, ice-alpine glaciation, ice-continental glaciation, gravity-landslides, gravity-mass wasting/general, tectonics-uplift, tectonics-subsidence, tectonics-volcanism, other-explain):

11. Timing of dominant landscape-forming processes (present-day / ongoing, recent past, distant past, not evident, other-explain):

Air Photo Data Sheet

Air Photo I.D. _____

Choose one or more of all observations that apply.

1. General landscape patterns (linear, dendritic, radiating, parallel, circular, undulating, non-descript, other-explain):

2. General landscape relief (low, medium, high):

3. Overall hillslope gradients (gentle, moderate, steep):

4. Vegetative Cover (non-existent, sparse, moderate, dense, other-explain):

5. Vegetative Type (grasses, shrubs, trees, other-explain):

6. Climate (humid, semi-arid, arid, other-explain):

7. Human Land-use (agricultural-grazing, agricultural-crops, residential, urban, industrial, forestry, mining, other-explain):

8. Dominant landforms (hillslopes, river channels, floodplains/terraces, alluvial fans, glacial valley, glacial moraine, alpine glacial features, continental glacial features, dunes, playa lakes, volcanic landforms, lava flows, coastal terraces, coastal landforms, other-explain)

9. Primary geomorphic agents (more than one possible: wind, water-fluvial, water-lacustrine, water-marine, ice-alpine glaciation, ice-continental glaciation, gravity-landslides, gravity-mass wasting/general, tectonics-uplift, tectonics-subsidence, tectonics-volcanism, other-explain):

11. Timing of dominant landscape-forming processes (present-day / ongoing, recent past, distant past, not evident, other-explain):

Air Photo Data Sheet

Air Photo I.D. _____

Choose one or more of all observations that apply.

1. General landscape patterns (linear, dendritic, radiating, parallel, circular, undulating, non-descript, other-explain):

2. General landscape relief (low, medium, high):

3. Overall hillslope gradients (gentle, moderate, steep):

4. Vegetative Cover (non-existent, sparse, moderate, dense, other-explain):

5. Vegetative Type (grasses, shrubs, trees, other-explain):

6. Climate (humid, semi-arid, arid, other-explain):

7. Human Land-use (agricultural-grazing, agricultural-crops, residential, urban, industrial, forestry, mining, other-explain):

8. Dominant landforms (hillslopes, river channels, floodplains/terraces, alluvial fans, glacial valley, glacial moraine, alpine glacial features, continental glacial features, dunes, playa lakes, volcanic landforms, lava flows, coastal terraces, coastal landforms, other-explain)

9. Primary geomorphic agents (more than one possible: wind, water-fluvial, water-lacustrine, water-marine, ice-alpine glaciation, ice-continental glaciation, gravity-landslides, gravity-mass wasting/general, tectonics-uplift, tectonics-subsidence, tectonics-volcanism, other-explain):

11. Timing of dominant landscape-forming processes (present-day / ongoing, recent past, distant past, not evident, other-explain):

Air Photo Data Sheet

Air Photo I.D. _____

Choose one or more of all observations that apply.

1. General landscape patterns (linear, dendritic, radiating, parallel, circular, undulating, non-descript, other-explain):

2. General landscape relief (low, medium, high):

3. Overall hillslope gradients (gentle, moderate, steep):

4. Vegetative Cover (non-existent, sparse, moderate, dense, other-explain):

5. Vegetative Type (grasses, shrubs, trees, other-explain):

6. Climate (humid, semi-arid, arid, other-explain):

7. Human Land-use (agricultural-grazing, agricultural-crops, residential, urban, industrial, forestry, mining, other-explain):

8. Dominant landforms (hillslopes, river channels, floodplains/terraces, alluvial fans, glacial valley, glacial moraine, alpine glacial features, continental glacial features, dunes, playa lakes, volcanic landforms, lava flows, coastal terraces, coastal landforms, other-explain)

9. Primary geomorphic agents (more than one possible: wind, water-fluvial, water-lacustrine, water-marine, ice-alpine glaciation, ice-continental glaciation, gravity-landslides, gravity-mass wasting/general, tectonics-uplift, tectonics-subsidence, tectonics-volcanism, other-explain):

11. Timing of dominant landscape-forming processes (present-day / ongoing, recent past, distant past, not evident, other-explain):

Air Photo Data Sheet

Air Photo I.D. _____

Choose one or more of all observations that apply.

1. General landscape patterns (linear, dendritic, radiating, parallel, circular, undulating, non-descript, other-explain):

2. General landscape relief (low, medium, high):

3. Overall hillslope gradients (gentle, moderate, steep):

4. Vegetative Cover (non-existent, sparse, moderate, dense, other-explain):

5. Vegetative Type (grasses, shrubs, trees, other-explain):

6. Climate (humid, semi-arid, arid, other-explain):

7. Human Land-use (agricultural-grazing, agricultural-crops, residential, urban, industrial, forestry, mining, other-explain):

8. Dominant landforms (hillslopes, river channels, floodplains/terraces, alluvial fans, glacial valley, glacial moraine, alpine glacial features, continental glacial features, dunes, playa lakes, volcanic landforms, lava flows, coastal terraces, coastal landforms, other-explain)

9. Primary geomorphic agents (more than one possible: wind, water-fluvial, water-lacustrine, water-marine, ice-alpine glaciation, ice-continental glaciation, gravity-landslides, gravity-mass wasting/general, tectonics-uplift, tectonics-subsidence, tectonics-volcanism, other-explain):

11. Timing of dominant landscape-forming processes (present-day / ongoing, recent past, distant past, not evident, other-explain):

Air Photo Data Sheet

Air Photo I.D. _____

Choose one or more of all observations that apply.

1. General landscape patterns (linear, dendritic, radiating, parallel, circular, undulating, non-descript, other-explain):

2. General landscape relief (low, medium, high):

3. Overall hillslope gradients (gentle, moderate, steep):

4. Vegetative Cover (non-existent, sparse, moderate, dense, other-explain):

5. Vegetative Type (grasses, shrubs, trees, other-explain):

6. Climate (humid, semi-arid, arid, other-explain):

7. Human Land-use (agricultural-grazing, agricultural-crops, residential, urban, industrial, forestry, mining, other-explain):

8. Dominant landforms (hillslopes, river channels, floodplains/terraces, alluvial fans, glacial valley, glacial moraine, alpine glacial features, continental glacial features, dunes, playa lakes, volcanic landforms, lava flows, coastal terraces, coastal landforms, other-explain)

9. Primary geomorphic agents (more than one possible: wind, water-fluvial, water-lacustrine, water-marine, ice-alpine glaciation, ice-continental glaciation, gravity-landslides, gravity-mass wasting/general, tectonics-uplift, tectonics-subsidence, tectonics-volcanism, other-explain):

11. Timing of dominant landscape-forming processes (present-day / ongoing, recent past, distant past, not evident, other-explain):

Air Photo Data Sheet

Air Photo I.D. _____

Choose one or more of all observations that apply.

1. General landscape patterns (linear, dendritic, radiating, parallel, circular, undulating, non-descript, other-explain):

2. General landscape relief (low, medium, high):

3. Overall hillslope gradients (gentle, moderate, steep):

4. Vegetative Cover (non-existent, sparse, moderate, dense, other-explain):

5. Vegetative Type (grasses, shrubs, trees, other-explain):

6. Climate (humid, semi-arid, arid, other-explain):

7. Human Land-use (agricultural-grazing, agricultural-crops, residential, urban, industrial, forestry, mining, other-explain):

8. Dominant landforms (hillslopes, river channels, floodplains/terraces, alluvial fans, glacial valley, glacial moraine, alpine glacial features, continental glacial features, dunes, playa lakes, volcanic landforms, lava flows, coastal terraces, coastal landforms, other-explain)

9. Primary geomorphic agents (more than one possible: wind, water-fluvial, water-lacustrine, water-marine, ice-alpine glaciation, ice-continental glaciation, gravity-landslides, gravity-mass wasting/general, tectonics-uplift, tectonics-subsidence, tectonics-volcanism, other-explain):

11. Timing of dominant landscape-forming processes (present-day / ongoing, recent past, distant past, not evident, other-explain):