Syllabus
Reading Grass Paramo: The High Andes Underfoot (GEOG 196)
Spring Break, 2020

Instructor: Stuart White

Introduction

This course will examine the origin and persistence of grass páramo, a high-elevation Andean savanna. Páramo covers extensive areas of the tropical Andes in an altitudinal belt between the tree line and the snowline. Despite its remoteness and wilderness aspect, evidence suggests that the development of grass páramo was driven by late Pleistocene hunter-gatherers.

Readings will examine three data sets that elucidate the process of grass páramo formation: fossil pollen, sedimentary charcoal and evidence of early hunter-gatherer occupation. The course will then assess how these data support or refute the conventional wisdom that grass páramo is a purely climatic expression or, as argued more recently, the replacement vegetation of a zonal forest removed by early agriculturalists.

A field trip during Spring Break will visit three grass páramos in Ecuador, located in Cajas, Sangay and Chimborazo National Parks. Students will walk páramo landscapes and apply their academic preparation to on-the-ground explanations of current tree lines, forest patches above tree line, the dominance of tussock grasses and giant ground rosettes, the frequency and behavior of fire, and plant tolerance to periodic burning. A hike to a high desert páramo in Chimborazo National Park will elucidate altitudinal constraints on the plant community.

By the end of the course, students will have a deeper appreciation of humans as a keystone species in grass páramo creation and maintenance. They will have applied the lessons of páramo etiology to an enlightened management and conservation of Ecuadorian páramos. Concurrently, students will have developed a sensibility to the weight of history on contemporary vegetation, and to the ubiquitous but sometimes elusive nature of anthropic inputs.

Outline of Topics

The mystery and beauty of páramo
- Look and feel of páramo vegetation
- Growth forms and types of páramo: Shrub páramo, grass páramo, desert páramo
- Associated fauna
- Páramo distribution in the Andes
- Plant adaptations to extreme altitude

Páramo as zonal vegetation, with critique
- Pleistocene vegetation reconstructions
- History of the zonal argument: Humboldt to Hooghiemstra
- Pollen analysis: How it’s done, and caveats of pollen analysis
- Vegetation distribution and behavioral anomalies: patch forests, contemporary tree plantations in páramo, irregular tree lines, shrub páramos, fire tolerance of tussock grasses, variations in tree line altitudes

Páramo as replacement vegetation
- Ellenberg’s argument for puna
- Lægaard’s argument for páramo
- Critique of páramo as a replacement community

A pause to regroup
- If not zonal nor replacement vegetation, what explains páramo?
- Available proxies: pollen, non-pollen polymorphs, charcoal, molecular markers
- Detailed review of the pollen evidence; emplacement of the early Holocene tree line
- A first look at the archaeological and genetic evidence of early peopling of the Americas

Charcoal record
- Potential sources of fire in the tropical Andes
- Sally Horn: Fire history in the Chirripó highlands of Costa Rica
- The charcoal record of the late Pleistocene and Holocene in the northern Andes

Review of the ‘early peopling’ evidence
- Hunter-gatherer arrival ≥ 15,000 BP
- Diffusion across South America and diversity of subsistence adaptations
The hunter-gatherer logic

- Was the páramo an amenable and productive environment for humans?
- The scenario of early habitat interventions by hunter-gatherers in the Andes and elsewhere
- Subsequent motivations to burn páramo for early agricultural societies, and for post-Conquest cattle husbandry

Situating grass páramo in the study of cultural landscapes

- The importance of history in understanding contemporary plant communities
- The New World was ‘discovered’, but it wasn’t new
- A nod to the Anthropocene
- An opportunity to explore human beings as a creative biological factor
- Applying the hunter-gatherer hypothesis to contemporary páramo conservation

Páramo literature

Articles assigned and to be posted on Black Board before Spring Break

Articles in photocopied reader during the Spring Break field trip


Spring Break field trip

Our field course during Spring Break will visit three spectacular mountainous national parks in Ecuador: Cajas, Sangay and Chimborazo. What unifies our experience in these parks is páramo. A trip to a desert páramo in Chimborazo National Park, between 13,000’ and 16,500’, will highlight altitudinal constraints on the plant community.

Students depart Saturday, March 7, 2020, leaving from JFK at 00:10 AM on a direct flight to Guayaquil. A bus will transport students from Guayaquil to Cuenca upon their arrival at 6AM. During the ensuing week we will visit páramos of the three national parks mentioned. Return travel will be on Sunday, March 15.

Grass páramo hillsides in Sangay National Park

Cajas National Park
Course Structure

Students will meet on two occasions with their instructor via the video conferencing feature of Blackboard, about one month before Spring Break. These meetings will anticipate the logistics of the field trip and introduce a list of readings to be completed before traveling to Ecuador.

Grading will be based on (i) an introductory exam (30%) that reviews pre-Spring Break readings, and that is given after our first páramo excursion in Cajas National Park; (ii) participation in the field studies during the Spring Break, including a short essay on the paramo experience (40%); and (iii) a final exam (30%), prior to the return to the U.S. This course earns 3 credits. It is offered through the Geography Department and open to students from all related disciplines.

Chimborazo Volcano, with snow-covered desert paramos at its base