

Pueblo Acoma, Warm Season Day

AI: Case Study of Climate Responsive Architecture

INTRODUCTION

Climate-responsive architecture originates in the pre-industrial era before the introduction of space conditioning and electric lighting. As the cost of non-renewable forms of energy increases and availability decreases, a return to the principles of climate-responsive architecture that utilizes natural energies of a particular region is a predicted outcome. As part of the renewed interest in design with climate, vernacular architecture is re-examined as an inspiration for contemporary design.

OBJECTIVES

In this exercise you and your colleagues will explore the fundamental design strategies of climate-responsive architecture for four primary climate regions: desert (hot arid), tropical (hot humid), temperate, and temperate/cold. The climate responsive principles you learn here will be applied later in design exercises. You may choose an indigenous or a contemporary building tradition for this study.

METHODOLOGY

1. Working as a 3-person team (you may also chose to work individually or in a 2-person team), select a climate-based indigenous or contemporary building tradition for your study. Use **at least two references** from a non-Internet resource such as a book or journal for your research. Record the references and include them in your bibliography. Ideally, each discussion section will have a team researching each of the four climate types: desert (hot arid), tropical (hot humid), temperate, and temperate/cold.
2. Describe the climate characteristics for your study region. Climate atlases from the CAUP or Suzzallo Library can help you confirm your climate zone and give you the necessary data to describe the major climate characteristics.
3. Describe the mechanisms for adaptation to the climate used by your building and the people who occupy it. Do this in terms of the following mechanisms:
 - **LOCATION** (and its corollaries: **orientation, juxtaposition and migration**)
 - **FORM** (and its corollaries: **surface-to-volume ratio, size, shape and skin**)
 - **METABOLISM** (or **energy conversion**)

Additional considerations

Where applicable, consider the following design categories to describe your building tradition:

SITE - Settlement patterns:

- How are these buildings placed in the landscape? What is the physical arrangement (e.g., clustered or scattered)? How does this arrangement relate to the terrain, geography, geology, or other landform patterns?

BUILDING - Building forms and materials:

- Does the building form relate to the climate (such as long and thin or compact)?
- What is the nature of building material?
- What types of openings (entrances, doors, and windows) are used?
- How does the building relate to the ground plane?
- How are all of these factors an adaptation to the climate?

LANDSCAPE - Landscape/Flora:

- What is the character of a typical landscape in this climate?
- What are the naturally occurring colors in the environment and how do they relate to heating, cooling, or use of daylight in the region?
- What are the common types of vegetation (i.e., in a very broad sense, are there cactus? evergreens or deciduous trees?) Do these elements have a relationship to the climate and can they play a role in enhancing human comfort?

HUMAN - Lifestyles/Cultural Adaptation:

- How do people live in this environment? Do they migrate between interior spaces based on time of day or seasonally? Do they move from interior to exterior with time of the day or seasonally?
- Does typical clothing worn in the region represent some aspect of the climatic response?

DELIVERABLES

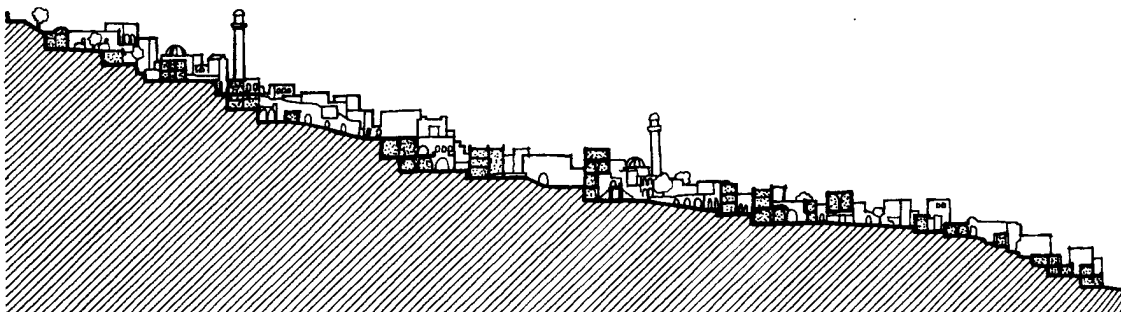
Part I: Proposal (email to your discussion section instructor by 5pm on Friday 4/4)

Write a one-page (max.) proposal that includes the following:

- Your names
- Building Tradition: briefly describe why this is a tradition of building/design that is strongly responsive to climate and place.
- Location: describe where this occurs (a map is encouraged but not required)
- References: at least one book or periodical reference

Part II: Presentation (in discussion section week 2)

Create a PowerPoint presentation and a hard copy summary (1-page, 11" x 17") that describes your building tradition in the terms suggested in the Methodology. Include bibliographic references in your report. Include your team members' names, climate type, and references in the report. Turn in a digital and hard-copy version of your presentation, along with a hard copy of your summary, at the time you're assigned to present.



Cross-Section, City of Mardin, Turkey