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A SUMMARY OF PROCESSES WHICH ARE CONNECTED TO EVAPORATION OF RIPARIAN AND HETEROGENEOUS UPLAND VEGETATION IN ARID REGIONS

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1. INTRODUCTION

The riparian zones and the upland vegetation in adjacent regions in the San Pedro River basin are of considerable interest because of the important role they may play in the hydrology and ecology of the region. A major goal of the SALSA program is to examine the factors which govern the hydrology of these zones. The general outline of the study has been detailed in Goodrich et al., this issue.

Here we present and discuss the main factors and issues which relate to the evaporation of the riparian zones and adjacent vegetation situated in an arid landscape. The Lewis Spring study site will serve as the focus of the investigation. Further hydrologic considerations are described in Maddock et al., this issue.

Because of the particular hydrology, as well as the narrow and heterogeneous nature of these zones, they present very unique problems towards understanding and quantifying the evaporation process. The biological and physical processes governing evaporation are likely different from those in ecosystems we have experience with.

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The goals here are: (1) to elucidate the main processes which govern the evaporation rates from such an ecosystem; (2) Describe a set of measurements which will be used to attempt to quantify short-term evaporation rates at the Lewis Springs study site.

2. CRITICAL PROCESSES

To begin, we describe our current vision of the key biophysical processes relevant to this ecosystem. Indeed, the knowledge of these factors and processes remains one of the main objectives.

At Lewis Springs, the upland vegetation exists in reasonably well-defined patches of dimensions of several hundred meters. However, the woodland corridor is a narrow zone of trees 50 to 70 m wide and over 20 m tall, distributed rather heterogeneously, with some sizable gaps in the zone. The narrow dimension and spatial heterogeneity create serious obstacles to estimation of evaporation rates for the whole corridor.

Note that short-term evaporation rates for local surfaces are best done using various micrometeorological approaches. However, these approaches are predicated upon several very critical assumptions. Among these are that the surface is horizontally uniform, and extensive enough so that a boundary layer can develop which is fully adjusted to the surface.

Semi-Arid Land-Surface-Atmosphere (*SALSA*) Program

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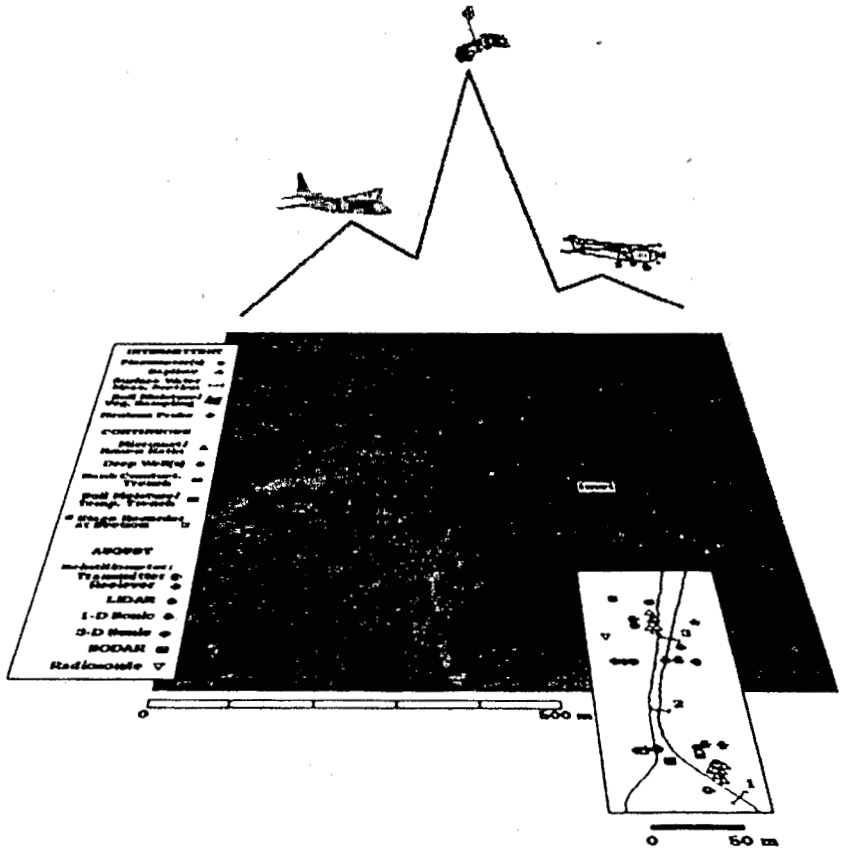

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