



## Types and internal hydro-geomorphologic variability of mallines (wet-meadows) of Patagonia: Emphasis on volcanic plateaus



Elizabeth Mazzoni<sup>a,\*</sup>, Jorge Rabassa<sup>b,c</sup>

<sup>a</sup> Universidad Nacional de la Patagonia Austral, Santa Cruz, Argentina

<sup>b</sup> Centro Austral de Investigaciones Científicas (CADIC – CONICET), Argentina

<sup>c</sup> Universidad Nacional de la Patagonia San Juan Bosco/Universidad Nacional de Tierra del Fuego, Ushuaia, Tierra del Fuego, Argentina

### ARTICLE INFO

#### Article history:

Received 16 August 2010

Accepted 22 August 2011

#### Keywords:

Patagonia

Wet-meadows

“Mallín”

Distribution

Variability

Physiography

### ABSTRACT

“Mallines” (wet-meadows) are Patagonian ecosystems that provide hydrological, biological and scenic resources. They develop in landscape locations that are favourable for water concentration. The area of each “mallín” is usually limited to a few, tens, or hundreds of hectares at most, but independently of their size, they present high variability in their internal physiographic characteristics. These are reflected on the vegetation distribution that basically responds to the space and time water distribution in the “mallín”, both at the surface as well as across the soil profile.

We analyze the internal variability of a “mallín type” and present a conceptual map that illustrates the functional relationships established between four basic elements: geomorphology, hydrology, soils and vegetation, whose interrelationships allowed the differentiation of various situations, which may correspond both to different “mallines” and to subunits within the same “mallín”.

© 2011 Elsevier Ltd. All rights reserved.

### 1. Introduction

Patagonia is a vast region located in the southernmost portion of the South American continent. The area has approximately 1 000 000 km<sup>2</sup> in surface and 2200 km in length, extending between latitudes 36° and 56° S. Its maximum width is 900 km, gradually narrowing southwards. The eastern and western boundaries of Patagonia are the Atlantic and Pacific oceans, respectively. Climatic conditions are mainly determined by the location of the Andean ranges and the South Pacific anticyclone. These two factors generate a noticeable west-east decrease in precipitation, creating a clear differentiation between a narrow, humid belt to the west (Patagonian Andean Environment) and the rest of the territory characterized by semiarid and arid conditions (Patagonian Tableland Environment, Fig. 1).

In both units, wet grasslands of Cyperaceae, Juncaceae and Gramineae, locally known as “mallines” (wet-meadows), are developed in association with particular conditions of the landscape where an unusual amount of water is available for plants (Movia et al., 1987). These azonal freshwater ecosystems are clearly distinguished from the steppe in arid environments (Fig. 2) and provide the most productive soils for cattle production. In some

sectors of Patagonia where the steppe has been severely affected by desertification (e.g., Soriano and Movia, 1986; Del Valle, 1998; Del Valle et al., 1998; Mazzoni and Vázquez, 2009) or natural disasters (e.g., the 1991 eruptions of the Hudson Volcano) mallines have become the only source of income for the rural population. Mallines are also habitat for several wildlife species, mainly birds, which use them as feeding, breeding and/or roosting sites (Blanco, 1999; Imberti and Barnet, 2003). Moreover, their landscape features have turned them into sites of interest for ecotourism.

Despite the importance of mallines, the area they cover in Patagonia is unknown, because in general they are small and are heterogeneously distributed in diverse geomorphological environments. Estimations made in different sectors of Patagonia provide values ranging between 1 and 4% for the tableland environment and between 5 and 7% for the Andean mountain range environment (Iriondo, 1989; Bran, 2004; Mazzoni and Vázquez, 2004). Bran (2004) stated that the total mallín area would be about 1 000 000 and 2 000 000 ha, depending on whether mallines are considered in a strict sense, i.e., including dry or degraded mallines, or not.

“Mallín” is an aboriginal term pertaining to the Mapuche nation language that denotes flooded areas with herbaceous ground cover (Ruiz Leal, 1972; Wilhelm de Moesbach, 1980). The name “pasto mallín” (mallín grass) designates the typical vegetation of the area (Vuletín, 1979), especially some rush species, like *Juncus balticus* and *Juncus lesueurii*, which are very abundant in these ecosystems.

\* Corresponding author.

E-mail addresses: [gis@uarg.unpa.edu.ar](mailto:gis@uarg.unpa.edu.ar), [elimazzoni@yahoo.com.ar](mailto:elimazzoni@yahoo.com.ar) (E. Mazzoni), [jrabassa@cadic.gov.ar](mailto:jrabassa@cadic.gov.ar) (J. Rabassa).

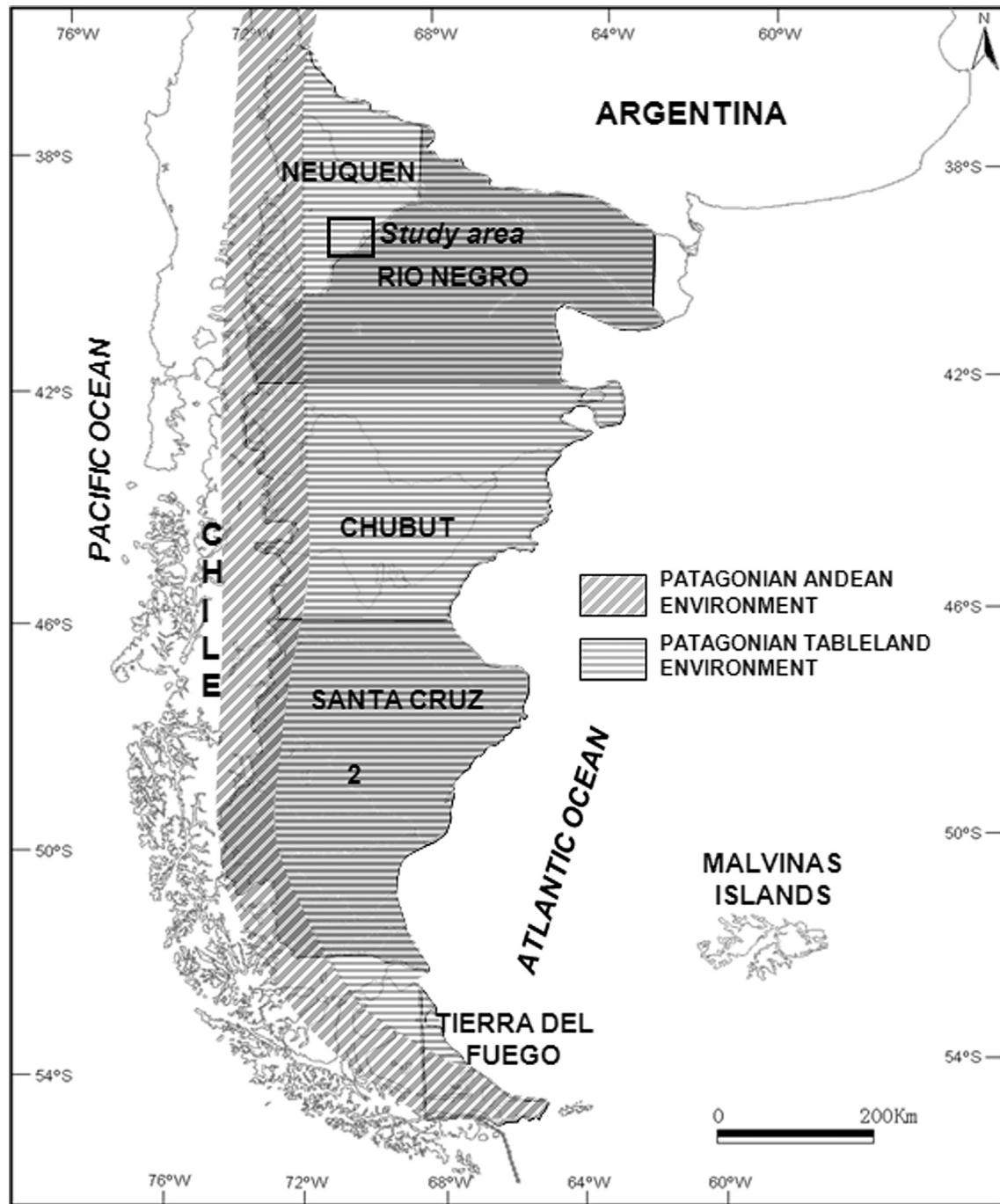


Fig. 1. Provinces of Argentine Patagonia, higher environmental units and location of study area.

According to the definition of wetland provided by the RAMSAR Convention, mallines are a particular type of wetland (Canevari et al., 1998). In wetlands water is the primary factor controlling the environment and associated plant and animal life, whereas its presence is determined by the geomorphological emplacement (Brinson and Malvárez, 2002).

Cowardin et al. (1979) and Mitsch and Gosselink (2000) defined *wetland* as the ecosystem that fulfils the following conditions: a) periodic presence of shallow waters or wet soils, b) hydromorphic soils that are different from the soils of surrounding sectors, and whose biochemical features are influenced by the anaerobic

conditions of flooded soils, and c) presence of plant species adapted to direct contact with water (hydrophytes). Mallín ecosystems also fulfil these conditions.

With reference to the most outstanding characteristics of wetlands, Brinson (2004) emphasizes the fact that in wetlands “patterns and processes are more variable than in terrestrial ecosystems”. Accordingly, the range of variation in wetland habitats is greater than that in terrestrial habitats situated in the same geographical region. This aspect is the one analyzed in this paper, taking into consideration examples of mallines developed in volcanic environments of extra-Andean Patagonia.

Download English Version:

<https://daneshyari.com/en/article/4682433>

Download Persian Version:

<https://daneshyari.com/article/4682433>

[Daneshyari.com](https://daneshyari.com)