Selection of the VLT Site

The readers of the *Messenger* may wonder how the selection of the site for the Very Large Telescope (VLT) is proceeding. The interest in this important matter seems to be rising; hardly a day passes without a corresponding request for information to the ESO Information Service.

Here is a short summary of the current situation.

The Site Selection Working Group (SSWG phase I: Chairman J.-P. Swings) delivered its final report about the meteorological conditions in the Paranal and La Silla areas in early May this year. This report was thoroughly discussed by the Scientific Technical Committee (STC) during its meeting on May 10–11. The STC passed a resolution, which endorsed the SSWG I recommendation to establish the VLT Observatory in the Paranal area and recommended that the ESO Executive work out and present a viable operational model of ESO/Chile with the Observatory on La Silla and the VLT Observatory in the Paranal area to the STC, the Finance Committee and Council in November/December 1990.

In its meeting in Sweden on June 7, the ESO Council passed the following resolution: "Council, taking note of the superior scientific qualities of the Paranal area, asks the ESO Executive to work out financial, technical and research policy implications and operational models of ESO/Chile for the Paranal area option as well as for the Vizcachas option."

This work is now under way at ESO. At the same time, a modified Site Selection Working Group has taken up its work during a first meeting at the ESO Headquarters on July 25. Whereas in the first phase, the SSWG mainly looked into the scientific aspects of the site choice, the terms of reference for SSWG phase II, as defined already in December 1988, also include the operational and financial pros and cons of the site options. J.-P. Swings (Belgium) continues as Chairman; other members are I. Appenzeller (F.R. Germany), A. Ardeberg (Sweden), G. Lelièvre (France) and S. Ortolani (Italy).

The SSWG II will have the important function of providing guidelines for and running criticism of the in-house study by the ESO management, before it is finalized and presented to the ESO Committees and Council later this year.

In this connection, a completely independent line of approach to the question of the long-term climatic stability in Northern Chile has become available. Dr. Michel Grenon of the Geneva Observatory, a regular visiting astronomer to La Silla during the past two decades and a botanist with strong interests in biogeography, has recently submitted a report on the climate in and around the Atacama desert, as deduced from sources, not considered in the SSWG study, but indicative of the climatic conditions in the past and the present around the possible VLT sites.

We are very pleased that Dr. Grenon has agreed to the publication of a popular account of this most interesting biogeographical study in this issue of the *Messenger.* We warmly commend it to the attention of our readers.

In accordance with the original planning, it is hoped that it will be possible to decide about the future VLT site before the end of the current year. In that case, the ground preparation (blasting, etc.) will start on-schedule in early 1991.

The Editor

The Northern Chile Climate and Its Evolution

A Pluridisciplinary Approach to the VLT Site Selection

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1. Introduction

The selection of an optimum astronomical site in northern Chile, undertaken by ESO for several years now, is a very complex task. The location of the VLT will effect the efficiency of the European astronomical community for the next 30 to 50 years. Therefore, it is of prime importance that the selected site optimizes the quality and the quantity of the collected data for the whole range of wavelengths being of interest now and in the future. At least four different parameters have to be considered:

1. the quality of the images (seeing);
2. the quality of the atmospheric transparency, namely the amount of aerosols and of the precipitable water and their time variation;
3. the annual distribution of photometric and spectroscopic nights;
4. the intermediate and long term evolution of climate with local response to global climatic changes.

Several factors complicate the selection of the site. A major problem is the scarcity of meteorological stations in northern Chile, as they are mainly located along the coast, below the inversion layer, or distributed in the main valleys. Little is known about the Andean or the precordillera area climate, south of 23 °S. The rather short duration of continuous records of half a century or less, depending on the measured quantities, make the definition of mean meteorological values and trends uncertain. Another important problem is the vastness of the domain to be investigated, i.e. about 1000 km in latitude and 200 km in longitude in which the potential sites are located in non-populated areas and hence have no meteorological or historical records. In the southern part of the Atacama desert, the occurrence of quasi periodic wet episodes separated by series of dry years, makes the comparison between sites difficult and possibly meaningless unless it is synchronous. With a semi-periodicity of 8 to 12 years, cf. section 3, measurements over 30 to 40 years are necessary to characterize the local mean climatic conditions.

The aim of this report is to provide information on the existing and anticipated sites, complementary to that collected by ESO investigators during the site testing campaign.

The present approach utilizes biogeography as a tool to define with a high spatial resolution the integrated climatic properties over various time scales depending on the life duration and propagation times of living beings considered. The data used here are either compiled from specialized literature or are the results of mainly botanical observations, made by the author in Chile since 1971. The connection with meteorological and climatical parameters will be made in order to define the