

Preface

It is difficult to summarize the reasons at the origin of a chain of events bringing to a final result. This Thesis reports some scientific results obtained on the basis of observations performed at the Locarno solar observatory Istituto Ricerche Solari Locarno – IRSOL in close collaboration with the Institute of Astronomy of the ETH in Zurich. The aim is to describe how ideas, instruments, observing methods and interpretation evolved to reach the conclusions. But the aspect I will point out in this preface is the role of persons who invested time and energy in this enterprise. In fact the evolution of the institute in Locarno and the achievement of these scientific results are related very closely.

The solar research station constructed in 1960 by the Universitäts-Sternwarte Göttingen in Germany was taken over by a private foundation in 1987, after it was dismantled. The motivation to reconstruct and develop the institute as an independent research center was based on the enthusiasm and on the interest in science of Alessandro Rima and Paul Utermohlen (†1992) at the head of a group of people convinced that the research at IRSOL had to go forward. The decision to sell the institute to this foundation, avoiding more profitable solutions, showed an open mind and real cultural interest of the Deutsche Forschungsgemeinschaft (represented by Axel Zienicke) and the Universitäts-Sternwarte Göttingen – USWG directed by Hans Heinrich Voigt.

The competence of Rima and Utermohlen, based on a large know-how, permitted to define the general direction and objectives of IRSOL. In a second phase the leadership was taken over by Philippe Jetzer, who followed the intentions of his predecessors and could show the direction in which IRSOL should evolve scientifically.

The technical and scientific work was my task. The role played by other people was indispensable help in the reconstruction. I would

like to remember Edi Alge (†2001) who was treasurer and technician of the institute. His optimism, his availability to help and his technical competence were always at disposal for the development of IRSOL. For the instrumental reconstruction, the help received by Karl Heinz Duensing was fundamental. He designed and constructed improved versions of the dismantled mechanical parts, and helped in the refurbishing of the pieces left in Locarno. The alignment of the Gregory Coudé telescope and the spectrograph was done by Eberhard Wiehr, who always stayed in contact with IRSOL for scientific works as well. The help of Axel Wittmann covered many domains: technical questions about the computer system, science (the first scientific work under FIRSOL of the institute in Locarno was with him), bureaucracy. All these contributions were allowed and supported (with the constraint that they should not interfere with the work in Tenerife) by the director of the USWG, H.H. Voigt and his successor Franz Kneer.

The development of electronics devices was possible thanks to the collaboration of Gerd Küveler of the Fachhochschule in Wiesbaden – FHSW. He did his Ph.D. at USWG in 1982 based on data recorded in Locarno. About 50 students of the FHSW have got their Diploma with a topic related to IRSOL.

The instrument was reconstructed, and some troubles with the government related to the financing of the institute could find a solution. Thus more time could be devoted to the principal objective of the institute: the scientific work. The contacts with Jan Olof Stenflo, director of the ETH Institute of Astronomy in Zurich, were always continued during the reconstruction phase, and it is to mention that his help in critical situations was always decisive. The definition of scientific observing projects with him and Sami Solanki permitted us to explore a solar physics domain which is showing a dramatic increase in interest world-wide. The collaboration of the entire Zurich team was always not only a scientific opportunity, but a way to meet a very amicable group of friends. With all the persons I could mention, I just pick out a few of them: Achim Gandorfer, who worked in Locarno for years to prepare and complete his project '*The atlas of the second solar spectrum*' and contributed in an important way to the life of IRSOL. Daniel Gisler spent long times in Locarno and could give important help. Dominique Fluri, who is completing his Thesis at the same time

as mine, was always ready to give his help in critical moments.

Observing with ZIMPOL (Zurich IMaging POLarimeter), the world-wide best solar polarimeter in the visible and near UV, is a unique experience. The support of Peter Povel, Peter Steiner, Frieder Aebersold was always effective and friendly.

Many scientific projects were started at IRSOL. With Alessandro Cacciani we are working at topics related to his magneto-optical filter. With Meir Semel and Arturo Lopez Ariste polarization observations were performed. Guido Sonnabend and Daniel Wirtz tested the infrared heterodyne sensor THIS.

The help given by Annelise Alge for the keeping of the house and the garden at IRSOL is joined to her kindness.

The experience acquired at IRSOL allowed me to spend more months at the Solar Observatory Sunspot in Sacramento Peak, New Mexico, in the group of Don Neidig. This gave me the opportunity to work in a big observatory together with a large scientific community. There I had the opportunity to know people as friends and not only as scientists.

My occupation after I got my Diploma was at Specola Solare Ticinese in Locarno, where I worked with and learned from Sergio Cortesi.

The Institute of Applied Physics, University of Bern, developed at Specola Solare Ticinese a solar flares observing program in the visible lasting for almost 15 years starting in 1980. I had the opportunity to collaborate with more graduate and PhD students of the Bern Institute. The collaboration with Andreas Magun is still actual.

The persons in the foundation council of FIRSOL are never directly mentioned in the description of the scientific results, but all what is done at the institute would not be possible without their unseen work.

I finally need to point out that the success of the work described in this Thesis is due not only to my work, but to a chain of important contributions from a number of people.

The words I would say to all of them is: thank you!

My hope is that this Thesis will be another small step in the IRSOL development, seen as a contribution to the cultural development of our society.