

## CHAPTER 1

### FLORISA MELONE: A PERSONAL REFLECTION

**Vijay P Singh**

Distinguished Professor &  
Caroline & William N. Lehrer Distinguished Chair in Water Engineering  
Department of Biological and Agricultural Engineering &  
Department of Civil & Environmental Engineering  
Texas A&M University, College Station, TX 77843, USA. Email: [vsingh@tamu.edu](mailto:vsingh@tamu.edu)

#### ABSTRACT

Dr. Florisa Melone symbolized what is good about humanity and in human beings, Fig. 1.1. In a life cut short by an unfortunate disease, Florisa left a lasting legacy and touched and enriched many lives. She was an outstanding scholar, a devoted wife, a caring mother, a lovely sister, a loyal friend, and, above all, an exemplary human being. This note is a personal reflection on some aspects of her life, including childhood, early and college education, marriage and family life, core beliefs and philosophy, sons' tribute to their mother, husband's tribute to his wife, professional career, technical contributions, and colleagues' tributes to collaborations with Florisa. The discussion is concluded with some personal memories.



**Fig. 1.1 A portrait of Florisa.**

## **1.1 CHILDHOOD**

Dr. Florisa Melone was born on November 12, 1954, in Terni, Italy, where she spent her childhood and adolescence. Until she was about 2 years old, her family lived in the outskirts and later moved in the house in the downtown where her mother still lives. Her parents, Guido (father) and Flavia (mother), had two other children-both sons. Gianfranco was the oldest son, Giampiero the second oldest son, and Florisa was the youngest daughter. Figure 1.2 shows Florisa with her brothers when they were children. Both of her brothers are currently living in Terni; they are married and they each have a daughter, Rita and Silvia who also are married. Silvia has three children, making the mother of Florisa great-grandmother and Florisa great aunt. Unfortunately, Florisa's father Guido died in a car accident in 1990, leaving Flavia alone.



**Fig. 1.2. Florisa two years old with her brothers, Gianfranco and Gianpiero.**

## 1.2. EARLY EDUCATION

Florisa's academic career followed the usual path, involving five years of elementary school from 1959 to 1964, three years of middle school from 1965 to 1968 at the Institute Leonardo da Vinci, and then four years of high school from 1969 to 1973 at the Scientific Lyceum Galileo Galilei. Her elementary school was in Campitello, a small village close to Terni, while her other schools were in Terni, for her family had moved there. Figure 1.3 shows Florisa in a recital at her elementary school. In school, she exhibited an aptitude for excellence in academic and extracurricular activities. Figure 1.4 shows her with her class in elementary school and Figure 1.5 with her classmates in high school. Her two older brothers elected to interrupt their studies and started to work for lending a helping hand to the family, especially financially, while Florisa continued her studies which meant a huge sacrifice on the part of her whole family. She finished her high school in 1973 with honors, and went on to enroll in the faculty of mathematics at the University of Perugia, Perugia. She graduated on 3rd March 1978 with 110/110 cum laude.



Fig. 1.3. Recital (elementary school).

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**Fig. 1.4. Elementary school.**



**Fig. 1.5. Florisa with her classmates in high school.**

### 1.3 MARRIAGE

During the first year at the University of Perugia, Florisa met Claudio with whom she got married on June 12, 1982, after an engagement period that lasted nearly 8 years. Since Florisa and Claudio had such a long companionship, they married with a lot of forethought, deliberation, planning-clearly marriage was not done in hurry by any means but it was a conclusion of the initial phase of their companionship and the beginning of her lives together.

Figure 1.6 portrays Florisa just before wedding and Fig. 1.7 is a portrait of Florisa and Claudio at the time of wedding. For them, the official wedding meant a new course in their lives with the convergence of different objectives, especially having a family and children. Enlightened as they were, Florisa and Claudio always gave



Fig. 1.6. Florisa just before wedding.



**Fig. 1.7. A wedding portrait.**

precedence to substance over form. Nevertheless they also believed that sometimes form and substance must be integrated. Formalizing the union between two people does not always equal the making of a relationship stronger, i.e., if the union is already stable a formal act is not needed, but it certainly is an act signifying the beginning in front of others and society where one lives. The wedding was a joy for them, for their parents, and for their friends and families.

#### **1.4 FAMILY LIFE**

About six months after their marriage, an unfortunate tragedy struck Florisa and Claudio. In January 1983 Claudio lost his mother who passed

away due to a sudden illness. It was a blow for Florisa who had developed a filial relationship with her and a very sad period followed. She had to deal with the new situation and solve emotional and practical problems. Fortunately, in 1984, she was blessed with a son who she named Michele. The birth of Michele brought a new wind in her and was uplifting, as often happens when a new life comes to light. Figure 1.8 shows Florisa with Michele. She felt that the birth of her son was some kind of a compensation for the loss of her mother-in-law, even if obviously this was not true. With the birth of Michele, her life greatly changed. For one, she had to juggle between home, work and child. Because she would not settle for anything other than excellence, a very busy period followed. Luckily, she had her mother who was a great help on a multitude of occasions. Florisa and Claudio always thought of having another child and they were fortunately blessed with another son in 1989. They named second son Giacomo. Figure 1.9 show Florisa with Giacomo. During her pregnancy with Giacomo, the last three months of the gestation were difficult and even problematic. As a result, Florisa had to stay in bed for long hours each day in order to alleviate the possibility of losing the baby. In later years she confessed that this was a very depressing period and painful experience of her life, for all the feelings and fears that she felt about her child. Fortunately, everything went well and Michele had a brother. Figure 1.10 is a portrait of Florisa and Claudio with their sons.



**Fig. 1.8. Florisa with Michele.**

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Fig. 1.9. Florisa with Giacomo.



Fig. 1.10. a) Florisa and family on vacation; b) Family on a skiing vacation.



Both of her sons are now grown up. As expected, they are well groomed, mature and handsome. They have made their choices and are living their lives. Michele is a graduate in mechanical engineering and now works in a private company, and Giacomo is dedicated to the field of computer graphics, and after his studies, is now waiting for a suitable employment.

Michele and Giacomo are two wonderful men. It is unfortunate that at such an early age they had to face and witness the illness and death of their mother who experienced a lot of suffering, but they did with courage and strength as their mother wanted. They are trying to cope with the tragedy of their mother's demise, overcome the irreparable loss, heal their emotional wounds, bear the pain and move forward. They have always been close to their mother and their father. Figure 1.10a is a portrait of family on vacation, and Figure 1.11 shows Florisa on a beach.



**Fig. 1.11. Florisa on a beach.**

## **1.5 CORE BELIEFS**

As a human being, Florisa was one of the nicest persons one would encounter. She was exceptionally kind, caring and always willing to help others. She always listened to everyone and tried to figure out how she could give a helping hand. She was not religious in a traditional sense, but in her day-to-day life she always applied the Christian principles or principles of humanity, while not professing them. Those who knew her harbored the same impressions about her.

## **1.6 SONS' TRIBUTE TO THEIR MOTHER**

Both Michele and Giacomo were near and dear to their mother. They harbor fond memories of their lives they shared with her. Elder son Michele writes about his mother as follows:

“To the person who taught me what is right and what is wrong, what is good and what is bad, what is important in life, to respect other people, to study, to learn, to draw, to be better and for everything that she gave me. I remember all the reproaches, all the advices, all the times that you helped me in the study, all the times that I was in a quandary and you helped me, but also the first time that you taught me to draw and paint. I remember all the holidays and the moments when we were together. I would like to remember you for everything that you realized in your life: raising two sons, taking care of a family extending to relatives, looking after a home, and working in a team that was for you like a second family. I would like to remember you for the strength, courage, wisdom, and lucidity to face the illness, and also when there was no hope. You were able to connect, to comfort, to understand, to love people and the last two days are the evidence. That everything you did would not be lost but that each one can take on as an example and inspiration from you and what you did. In particular, I would like to remember you for the niceness, lovability, gracefulness, harmony that you were able to give people.”

Younger son Giacomo writes about his mother:

“I might say many things about my mother, but it is sufficient to look around and see how many people will attend the Conference who, in

addition to presenting many technical works, would like to add something about her as a person. My mother always believed in humanity and human beings, who give their neighbor without requiring anything in return. She believed in what she did, not for money or power, but for the emotion that can give a generous gesture. I remember the joy that she felt when the CNR guys came to visit her during the illness and by a simple "thank you" made her smile. I can say that she taught us the love so much, by putting always the neighbor before herself, even during her illness. I think that only a few persons are able to understand and apply one of the best feelings of a human being: the love for the family and the neighbor. She taught us to never give up and I can say that she is successful with my father in what all parents hope and dream: to teach their children what life is."

## **1.7 HUSBAND'S TRIBUTE TO HIS WIFE**

Florisia's husband Claudio writes: "A few days are left before the one-year anniversary of Florisa's demise and I did not realize yet that nearly twelve months have since passed. Mentally, it feels like time stopped that October 28 of the last year (2012). Inevitably, the loss of one's lifetime companion leaves permanent scars and signs and one of them is the different perception of the flow of time.

I met Florisa during my first year of university in 1974, when we followed together the same physics class that was common for the degree courses in Mathematics and Engineering. About a year later, our life story began and lasted for 38 years. Unfortunately in the journey we embarked upon together, she was taken away and our story broke on the way that you all know.

The period of 38 years is a very long time in a person's life and is full of memories, events and happenings, some really memorable, some leaving indelible impressions. Were I to choose among those I might have difficulty, so I will not dwell on specific events but say something generic. I would specifically like to mention two peculiarities of Florisa.

First, she was a special person who held in high esteem the human side of people with whom she had a relationship, both in the work environment and in the friendship or family. She always acted with great care for the needs of others and very often even putting them before her own. She was always ready to provide help to those who needed help, in

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small things as well as in the most important ones. I think this was a very beautiful side of her character, important and obvious to all who knew her not superficially. If someone needed help, she was always willing and in cases where she could not or was not able to be helpful, she felt very bad.

The other quality that I would like to highlight about Florisa's character is her determination combined with a strong will. She always showed great responsibility in the activities she did, from study to work to the management of the family and the house. In the last period of her life, she faced the disease in an exemplary way, overcoming the moments of despair with strength and courage that I was totally impressed. I think only a few people have faced the same physical and psychological hardships that she did with dignity and fortitude.

Regarding our lives together, what I would like to remember with a sense of fulfillment and gratitude is the fact that we grew up together as people. Our union began when we were quite young, about 20 years old and since then we really grew up together, helping each other and together we faced the beautiful and not so beautiful aspects that life showed us from time to time. It is really beautiful and gratifying to go back the memory lane and to envision myself now as if I was twenty, and understand how her closeness changed me, helping me to mature by calmly dealing with everyday living. I think that, in my turn, I had contributed so that she reached her serenity and I am particularly happy for that. I can say that we exchanged experiences and points of view, which we both enjoyed. What she liked most was to be able to continue our journey together to old age and to complete it. Unfortunately, our fate meant otherwise and we did not succeed.

Finally, I would like to end these few sentences with a consideration. It is common saying about a husband, a wife, a partner or a companion that "he or she is my better half." Here, Florisa was truly my better half and since she passed away, it is like my half has gone as well. I would like to affirm that this is not rhetoric and it is tough to go on without her, but I am helped by her masterful memory and the example that she gave to all of us and to me first.

A heartfelt thanks to all of you, who have wanted to honor and remember her, by organizing and participating in this wonderful event."

## **1.8 TRIBUTE FROM DR. TOMMASO MORAMARCO, A CLOSE CO-WORKER AND COLLEAGUE**

Needless to say, it is not easy to talk about a person who passed away and with whom, in addition, one has shared the professional work load for more than 16 years. I would not dwell upon Florisa's scientific capabilities because they are well known to all and it suffices to have a look at her curriculum vita. I do not want to even talk about the scientific acknowledgments from national and international institutions of the Hydrology IRPI team that Florisa and I established together more than 12 years ago. In this short note, I would like instead to remark Florisa's qualities both as a colleague and friend.

As a colleague, in these many years of working together, I discovered how Florisa was endowed with a rare quality, difficult to find in a human being, in general, and in a researcher, in particular: the humility. During her career, Florisa developed outstanding works in the areas of applied hydrology and for that she had a high visibility towards the external world and despite that, she remained always humble and willing to listen and cooperate with others.

Florisa was also a close friend with deep generosity and loyalty. I have a particular memory of Florisa that I will keep forever in my heart that I like to share through this note. At the beginning of my stay in Perugia, on 6<sup>th</sup> January 1996, the feast day of Epiphany, my wife Ileana, around noon, felt very sick for a serious infection in her kidneys. At that time, I did not know any doctors in Perugia as well as the location of the hospital. Considering that it was a holiday and, in addition, the lunchtime, I phoned Florisa asking her direction for getting to the hospital. Although she had some guests at her home for the lunch of Epiphany, she left everything and came immediately to visit Ileana and to my great surprise she came with a doctor as well. She stayed with us as long as Ileana felt better. I guess that Florisa's guests had the Epiphany lunch without her. This is how Florisa was: a generous person always ready to help everyone if any. Florisa was agnostic, but I never met a person who has lived the Christian principles of humility and generosity, i.e., the love for the neighbor, like her. The proof is that even during her disease, she always put the problems of others before her own.

I miss Florisa, I miss her smiles, suggestions and encouragements, and above all her gentleness. I think my this feeling is shared by all those

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who knew her, and in particular the young researchers of the IRPI Hydrology Team for whom Florisa was considered as a “second mother,” always willing to accomplish any of their requests, solve doubts or difficulty. I would like to conclude with a sentence from Sirach’s book of Bible (3, 17-19) that shows about the human beings what is well appreciated by God: “My child, conduct your affairs with gentleness and you will be loved more than a person of good repute. However great you become, humble yourself more, and you will find favor before the Lord.” I deem that Florisa certainly has found favor before the Lord. Thanks Florisa!”

## **1.9 PROFESSIONAL CAREER**

Dr. Florisa Melone received an M.S. degree in Mathematics, with excellence, from the University of Perugia, Italy, in 1978. She got a two-year scholarship of the National Research Council (CNR) in hydrological time series analysis, at the Institute for Hydrogeological Protection Research (IRPI) of CNR, from 1979 to 1980. She was a Researcher at CNR-IRPI from 1981 to 1996 and 1996-2011 Senior Researcher and 2001-2012 Head Researcher. Since 1981 she conducted research in the field of catchment hydrology addressing flood forecasting and hydraulic risk mitigation. In particular, the research topics she pursued were: hydro-meteorological monitoring, infiltration modelling, rainfall spatial variability, soil moisture spatial and temporal variability, rainfall runoff modelling, flood routing in natural channels, real-time flood forecasting, remote sensing for hydrological applications, water resources management, hydraulic risk analysis and climate change. She was a co-author of more 200 papers of which 57 appeared in refereed journals. She directed M. Sc. theses and she was tutor of research grants and scholarships in the hydrology research areas. She served as a referee for leading hydrology journals. She was the leader of the Hydrologic Section of IRPI for several years. She advised authorities for establishing measures for flood protection and also addressed forward planning. She was a coordinator and scientific person responsible for national projects on hydro-meteorological monitoring and flood forecasting and she actively participated in several research projects in the framework of Italian and European Programs. In the beginning Florisa’s main collaborators were Professors Corrado Corradini and Lucio Ubertini at

IRPI and from outside Professor Vijay P. Singh from the United States. Several years later, Dr. Tommaso Moramarco became his main collaborator and then Dr. Luca Brocca and others joined her. A list of her collaborators is given in Table 1.1.

**Table 1.1. Florisa's collaborators.**

Name	Name	Name	Name
Barbetta, S.	Faruolo, M.	Martin, C.	Ponziani, F.
Bartalis, Z.	Ferraris, S.	Martinez-Fernández, J.	Ratto, S.
Berni, N.	Flammini, A.	Matgen, P.	Sahoo, B.
Bittelli, M.	Franchini, M.	Melzer, T.	Saltalippi, C.
Borga, M.,	Gumuzzio, A.	Morbidelli, R.	Singh, V.P.
Brocca, L.	Hahn, S.	Moramarco, T.	Smith, R.E.
Calamita, G.,	Hasenauer, S.	Naeimi, V.	Tarpanelli, A.
Camici, S.	Heitz, S.	Penna, D.	Tramutoli, V.
Caudaro, M.	Lacava, T.	Perumal, M.	Tullo, T.
Corato, G.	Lapenna, V.	Pergola, N.	Ubertini, L.
Corradini, C.	Latron, J.	Perrone, A.	Volk, M.
Didon-Lescot, J.-F.	Liersch, S.	Piscitelli, S.	Wagner, W.
Dorigo, W.	Llorens, P.		

## 1.10 TECHNICAL CONTRIBUTIONS

Being a mathematician by training Dr. Melone's research encompassed a broad range of topics dealing with surface water hydrology and unsaturated zone hydrology. Before discussing her technical contributions, it will be interesting to give a short background to her professional pursuits. Florisa started her professional pursuits in 1979, cooperating with Prof. Lucio Ubertini at the Institute for Hydrogeological Protection Research in Central Italy of National Research Council. The topic she developed at the beginning was the use of transfer plus noise models for simulation and prediction of discharge at different time scales. Because of her expertise in dealing with mathematical modeling she was able to incorporate important innovative elements in the classical approaches widely used in the literature at that time. Later, with the transfer of Dr. Corradini to Perugia she made a great contribution to the formation of a research group in both the experimental field (with the

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support by qualified technicians: Bani, Fastelli, Rosi) as well as the theoretical one. Professor Corradini writes: “Florisa was available to all the possible critical evaluation of the group activity and ready to address the activities along the lines considered more promising. For example, she preferred to break off from stochastic modeling, choosing the development of semi-distributed conceptual models. In this context Florisa brought forward mathematical elements and very well integrated them with the physical reality. She provided considerable contributions in a variety of studies as: modeling of rainfall spatial distribution and effects of orography, design of hydrometeorological networks for flood forecasting, definition of the characteristics of a meteorological radar for rainfall measurements, realization of adaptive models for flood forecasting, and applications of the geomorphologic instantaneous unit hydrograph and scale problems. The cooperation of Prof. Vijay Singh was a crucial element in developing a few of these subjects, particularly through the scientific discussions with Florisa. The confidential relationships established by Florisa with different visiting researchers were a basic element for improving the group level. Particularly useful was the cooperation with Dr. Roger Smith in the period from 1992 to 1999, when many valuable papers were realized on rainfall infiltration.”

Her research accomplishments can be grouped into 10 categories. A short discussion in what follows highlights her contributions.

### **1.10.1 Rainfall Distribution and Generation**

In collaboration with Corradini, Moramarco, Brocca, and others, Florisa made important contributions in the rainfall area. Her research focus was describing the spatial structure and distribution of rainfall in the Mediterranean area, development of a simple approach for stochastic generation of spatial rainfall patterns, and development of a new method for rainfall estimation using soil moisture observations. Her rainfall research is described in refereed journal articles given below:

1. Corradini, C., Melone, F. (1988). Spatial distribution of pre-warm front rainfall in the Mediterranean area. *Nordic Hydrology*, 19(1), 53-64.
2. Corradini, C., Melone, F. (1989). Spatial structure of rainfall in mid-latitude cold front-systems. *Journal of Hydrology*, 105(3-4), 297-316.



3. Tarpanelli, A., Franchini, M., Brocca, L., Camici, S., Melone, F., Moramarco, T. (2012). A simple approach for stochastic generation of spatial rainfall patterns. *Journal of Hydrology*, 472-473, 63-76.
4. Brocca, L., Moramarco, T., Melone, F., Wagner, W. (2013). A new method for rainfall estimation through soil moisture observations. *Geophysical Research Letters*, 40(5), 853-858.

### 1.10.2 Rainfall-Runoff Modeling

Florisia contributed significantly in the rainfall-runoff modeling area. Beginning with the development of instantaneous unit hydrographs for both gaged and ungaged basins, she investigated into the interaction of infiltration and surface runoff, assessment of urban flooding, improvement of runoff prediction by better accounting of soil moisture, and flood risk management. In collaboration with her colleagues at IRPI and University of Perugia and the United States, her research is widely published in refereed journals listed below:

1. Singh, V.P., Corradini, C., Melone, F. (1985). A comparison of some methods of deriving the instantaneous unit hydrograph. *Nordic Hydrology*, 16(1), 1-10.
2. Corradini, C., Melone, F., Singh, V.P. (1989). A simple approximation of the hydrograph downstream of a flooded area. *Nordic Hydrology*, 20(3), 179-190.
3. Corradini, C., Melone, F., Singh, V.P. (1995). Some remarks on the use of GIUH in the hydrological practice. *Nordic Hydrology*, 26(4-5), 297-312.
4. Corradini, C., Morbidelli, R., Melone, F. (1998). On the interaction between infiltration and Hortonian runoff. *Journal of Hydrology*, 204(1-4), 52-67.
5. Melone, F., Corradini, C., Singh, V.P. Simulation of the direct runoff hydrograph at basin outlet (1998). *Hydrological Processes*, 12(5), 769-779.
6. Melone, F., Corradini, C., Singh, V.P. (2002). Lag prediction in ungauged basins: An investigation through actual data of the upper Tiber river valley. *Hydrological Processes*, 16(5), 1085-1095.
7. Moramarco, T., Melone, F., Singh, V.P. (2005). Assessment of flooding in urbanized ungauged basins: A case study in the Upper Tiber area, Italy. *Hydrological Processes*, 19(10), 1909-1924.
8. Brocca, L., Barbetta, S., Melone, F., Moramarco, T. (2010). A continuous rainfall-runoff model derived from investigations in a small experimental basin. *IAHS-AISH Publication*, 336, 179-185.

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9. Brocca, L., Melone, F., Moramarco, T., Wagner, W., Naeimi, V., Bartalis, Z., Hasenauer, S. (2010). Improving runoff prediction through the assimilation of the ASCAT soil moisture product. *Hydrology and Earth System Sciences*, 14(10), 1881-1893.
10. Brocca, L., Melone, F., Moramarco, T., Penna, D., Borga, M., Matgen, P., Heitz, S. (2011). Investigation of the hydrologic response of three experimental basins across Europe. *Bodenkultur*, 62(1-4), 31-37.
11. Brocca, L., Melone, F., Moramarco, T., Penna, D., Borga, M., Matgen, P., Gumuzzio, A., Martinez-Fernández, J., Wagner, W. (2013). Detecting threshold hydrological response through satellite soil moisture data. *Bodenkultur*, in press.
12. Brocca, L., Liersch, S., Melone, F., Moramarco, T., Volk, M. (2013). Application of a model-based rainfall-runoff database as efficient tool for flood risk management. *Hydrology and Earth System Sciences*, in press.

### **1.10.3 Flood Forecasting**

In the area of flood forecasting she dealt with both real-time forecasting and prediction. She developed adaptive semi-distributed models for forecasting, incorporation of infiltration in forecasting, stage forecasting, variable parameter Muskingum stage forecasting and confidence intervals for real-time stage forecasts. Her collaborative research work is published in refereed journal articles given below:

1. Corradini, C., Melone, F. (1986). An adaptive model for on-line flood predictions using a piecewise uniformity framework. *Journal of Hydrology*, 88(3-4), 365-382.
2. Corradini, C., Melone, F., Ubertini, L. (1986). A semi-distributed adaptive model for real-time flood forecasting. *Water Resources Bulletin*, 22(6), 1031-1038.
3. Corradini, C., Melone, F., Singh, V.P. (1987). On the structure of a semi-distributed adaptive model for flood forecasting. *Hydrological Sciences Journal*, 32(2), 227-242.
4. Corradini, C., Morbidelli, R., Saltalippi, C., Melone, F. (2004). Flood forecasting and infiltration modeling. *Hydrological Sciences Journal*, 49(2), 227-236.
5. Moramarco, T., Barbetta, S., Melone, F., Singh, V.P. (2006). A real-time stage Muskingum forecasting model for a site without rating curve. *Hydrological Sciences Journal*, 51(1), 66-82.

6. Perumal, M., Moramarco, T., Barbetta, S., Melone, F., Sahoo, B. (2011). Real-time flood stage forecasting by variable parameter Muskingum stage hydrograph routing method. *Hydrology Research*, 42(2-3), 150-161.
7. Barbetta, S., Moramarco, T., Franchini, M., Melone, F., Brocca, L., Singh, V.P. (2011). Case study: Improving real-time stage forecasting Muskingum model by incorporating the rating curve model. *Journal of Hydrologic Engineering*, 16(6), 540-557.
8. Barbetta, S., Moramarco, T., Brocca, L., Franchini, M., Melone, F. (2013). Confidence interval of real-time forecast stages provided by the STAFOM-RCM model: The case study of the Tiber River (Italy). *Hydrological Processes*, doi:10.1002/hyp.9613, in press.
9. Barbetta, S., Moramarco, T., Brocca, L., Franchini, M., Melone, F. (2013). Confidence interval of real-time forecast stages provided by the STAFOM-RCM model: The case study of the Tiber River (Italy). *Hydrological Processes*, doi:10.1002/hyp.9613, in press.

#### 1.10.4 Infiltration Modeling

In collaboration with Corradini, Smith, and others, Florisa investigated different aspects of infiltration, including modeling infiltration and redistribution in crusted soils, modeling infiltration for multistorm runoff and under complex rainfall sequences, modeling infiltration in layered soils under complex rainfall patterns, and representation of infiltration in adaptive rainfall-runoff models. Her collaborative research is published in refereed journal articles given below:

1. Corradini, C., Melone, F. (1992). Representation of infiltration in adaptive rainfall-runoff models. *Nordic Hydrology*, 23(5), 291-304.
2. Smith, R.E., Corradini, C., Melone, F. (1993). Modeling infiltration for multistorm runoff events. *Water Resources Research*, 29 (1), 133-144.
3. Corradini, C., Melone, F., Smith, R.E. (1994). Modeling infiltration during complex rainfall sequences. *Water Resources Research*, 30(10), 2777-2784.
4. Corradini, C., Melone, F., Smith, R.E. (1997). A unified model for infiltration and redistribution during complex rainfall patterns. *Journal of Hydrology*, 192(1-4), 104-124.
5. Smith, R.E., Corradini, C., Melone, F. (1999). A conceptual model for infiltration and redistribution in crusted soils. *Water Resources Research*, 35(5), 1385-1393.

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6. Corradini, C., Melone, F., Smith, R.E. (2000). Modeling local infiltration for a two-layered soil under complex rainfall patterns. *Journal of Hydrology*, 237(1-2), 58-73.
7. Melone, F., Corradini, C., Morbidelli, R., Saltalippi, C. (2006). Laboratory experimental check of a conceptual model for infiltration under complex rainfall patterns. *Hydrological Processes*, 20(3), 439-452.

### **1.10.5 Flood Routing**

In collaboration with Perumal and Moramarco, Florisa also delved into flow routing as published in a journal article shown below.

1. Perumal, M., Moramarco, T., Melone, F. (2007). A caution about the multilinear discrete lag-cascade model for flood routing. *Journal of Hydrology*, 338(3-4), 308-314.

### **1.10.6 Stage-Discharge Relation**

Florisa made a significant contribution to the literature on rating curves. Her collaborative work is reported in two refereed journal articles given as follows:

1. Moramarco, T., Barbetta, S., Melone, F., Singh, V.P. (2005). Relating local stage and remote discharge with significant lateral inflow. *Journal of Hydrologic Engineering*, 10(1), 58-69.
2. Barbetta, S., Franchini, M., Melone, F., Moramarco, T. (2012). Enhancement and comprehensive evaluation of the rating curve model for different river sites. *Journal of Hydrology*, 464-465, 376-387.

### **1.10.7 Soil Moisture Variability**

During the last five years of her professional life, Florisa, in collaboration with her colleagues at IRPI and University of Perugia and the United States, dealt with a wide range of aspects related to soil moisture. Beginning with an investigation into the spatial variability of soil moisture, she went on to investigating space-time soil moisture variability across scales, soil moisture estimation, estimation of antecedent wetness, soil moisture profiles under complex rainfall patterns, integration of soil

moisture into rainfall-runoff modeling, and soil moisture measurement. Her collaborative work is published in refereed journal articles which are given below:

1. Brocca, L., Morbidelli, R., Melone, F., Moramarco, T. (2007). Soil moisture spatial variability in experimental areas of central Italy. *Journal of Hydrology*, 333(2-4), 356-373.
2. Brocca, L., Melone, F., Moramarco, T. (2008). On the estimation of antecedent wetness conditions in rainfall-runoff modeling. *Hydrological Processes*, 22(5), 629-642.
3. Melone, F., Corradini, C., Morbidelli, R., Saltalippi, C., Flammini, A. (2008). Comparison of theoretical and experimental soil moisture profiles under complex rainfall patterns. *Journal of Hydrologic Engineering*, 13(12), 1170-1176.
4. Brocca, L., Melone, F., Moramarco, T., Morbidelli, R. (2009). Antecedent wetness conditions based on ERS scatterometer data. *Journal of Hydrology*, 364(1-2), 73-87.
5. Brocca, L., Melone, F., Moramarco, T., Morbidelli, R. (2009). Soil moisture temporal stability over experimental areas in Central Italy. *Geoderma*, 148(3-4), 364-374.
6. Brocca, L., Melone, F., Moramarco, T., Singh, V.P. (2009). Assimilation of observed soil moisture data in storm rainfall-runoff modeling. *Journal of Hydrologic Engineering*, 14(2), 153-165.
7. Brocca, L., Melone, F., Moramarco, T., Morbidelli, R. (2010). Spatial-temporal variability of soil moisture and its estimation across scales. *Water Resources Research*, 46(2), W02516.
8. Brocca, L., Melone, F., Moramarco, T., Wagner, W., Hasenauer, S. (2010). ASCAT soil wetness index validation through in situ and modeled soil moisture data in central Italy. *Remote Sensing of Environment*, 114(11), 2745-2755.
9. Lacava, T., Brocca, L., Calice, G., Melone, F., Moramarco, T., Pergola, N., Tramutoli, V. (2010). Soil moisture variations monitoring by AMSU-based soil wetness indices: A long-term inter-comparison with ground measurements. *Remote Sensing of Environment*, 114(10), 2317-2325.
10. Camici, S., Tarpanelli, A., Brocca, L., Melone, F., Moramarco, T. (2011). Design soil moisture estimation by comparing continuous and storm-based rainfall-runoff modeling. *Water Resources Research*, 47(5), W05527.

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11. Brocca, L., Hasenauer, S., Lacava, T., Melone, F., Moramarco, T., Wagner, W., Dorigo, W., Matgen, P., Martínez-Fernández, J., Llorens, P., Latron, J., Martin, C., Bittelli, M. (2011). Soil moisture estimation through ASCAT and AMSR-E sensors: An intercomparison and validation study across Europe. *Remote Sensing of Environment*, 115(12), 3390-3408.
12. Brocca, L., Moramarco, T., Melone, F., Wagner, W., Hasenauer, S., Hahn, S. (2012). Assimilation of surface- and root-zone ASCAT soil moisture products into rainfall-runoff modeling. *IEEE Transactions on Geoscience and Remote Sensing*, 50(7), 2542-2555.
13. Brocca, L., Tullio, T., Melone, F., Moramarco, T., Morbidelli, R. (2012). Catchment scale soil moisture spatial-temporal variability. *Journal of Hydrology*, 422-423, 63-75.
14. Lacava, T., Brocca, L., Coviello, I., Faruolo, M., Melone, F., Moramarco, T., Pergola, N., Tramutoli, V. (2012). Soil moisture variability estimation through AMSU radiometer. *European Journal of Remote Sensing*, 45, 89-97.
15. Calamita, G., Brocca, L., Perrone, A., Piscitelli, S., Lapenna, V., Melone, F., Moramarco, T. (2012). Electrical resistivity and TDR methods for soil moisture estimation in central Italy test-sites. *Journal of Hydrology*, 454-455, 101-112.
16. Brocca, L., Tarpanelli, A., Melone, F., Moramarco, T., Caudaro, M., Ratto, S., Ferraris, S., Berni, N., Ponziani, F., Wagner, W., Melzer, T. (2013). Soil moisture estimation in alpine catchments through modelling and satellite observations. *Vadose Zone Journal*, doi:10.2136/vzj2012.0102, in press.
17. Brocca, L., Camici, S., Melone, F., Moramarco, T., Martínez-Fernández, J., Didon-Lescot, J.-F., Morbidelli, R. (2013). Improving the representation of soil moisture by using a semi-analytical infiltration model. *Hydrological Processes*, doi:10.1002/hyp.9766, in press.

### **1.10.8 Flood Frequency Distributions**

Florisia also delved into the area of flood frequency distributions as shown in a journal article given below:

1. Brocca, L., Melone, F., Moramarco, T. (2011). Distributed rainfall-runoff modelling for flood frequency estimation and flood forecasting. *Hydrological Processes*, 25(18), 2801-2813.

### 1.10.9 Hydraulic Modeling

In the hydraulics area, Florisa and her collaborators investigated into the variation of river discharge in ungauged basins, depth distribution in natural channels, uncertainty analysis for flow velocity estimation, and hydraulic modeling calibration. Her collaborative research is published in refereed journal articles given below:

1. Tarpanelli, A., Brocca, L., Melone, F., Moramarco, T. (2013). Hydraulic modelling calibration in small rivers by using coarse resolution synthetic aperture radar imagery. *Hydrological Processes*, 27(9), 1321-1330.
2. Tarpanelli, A., Brocca, L., Lacava, T., Melone, F., Moramarco, T., Faruolo, M., Pergola, N., Tramutoli, V. (2013). Toward the estimation of river discharge variations using MODIS data in ungauged basins. *Remote Sensing of Environment*, 136, 47-55.
3. Moramarco, T., Corato, G., Melone, F., Singh, V.P. (2013). An entropy-based method for determining the flow depth distribution in natural channels. *Journal of Hydrology*, 497, 176-188.
4. Corato, G., Melone, F., Moramarco, T., Singh, V.P. Uncertainty analysis of flow velocity estimation by a simplified entropy model (2013). *Hydrological Processes*, doi:10.1002/hyp.9590, in press.

### 1.10.10 Landslides

Florisa also dealt with landslide forecasting using soil moisture work that she and her co-workers did, as shown below:

1. Brocca, L., Ponziani, F., Moramarco, T., Melone, F., Berni, N., Wagner, W. (2012). Improving landslide forecasting using ASCAT-derived soil moisture data: A case study of the Torgiovanetto landslide in central Italy. *Remote Sensing*, 4(5), 1232-1244.

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### **1.11 SUMMATION**

Florisia is physically no more, but her spirits lives on. The ideals she lived for and practiced will be as inspiring as when she was alive. In many ways, she became a part of our lives and will therefore be with us as long we live. She is sorely missed, but we are grateful that we were blessed to have her with us as long as we did. She enriched our lives and the best tribute that we can pay her is that we live Florisa's way as much as we can.

### **1.12 ACKNOWLEDGMENTS**

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