<u>**Biographical Sketch for Milija Zupanski**</u>
Cooperative Institute for Research in the Atmosphere,
Colorado State University, Fort Collins, CO 80523

Education
1980   BS   University of Belgrade, Serbia, Meteorology
1987   MS   University of Oklahoma, Meteorology
1990   PhD   University of Oklahoma, Meteorology

Work Experience
2011-Present Data Assimilation Team Lead, CIRA/CSU
2010-Present Senior Research Scientist, CIRA/CSU
2003-2010   Research Scientist III, CIRA/CSU
2002-2003   Research Scientist II, CIRA/CSU
2001-2002   CIRA Associate Fellow, CIRA/CSU
1992-2001   Visiting Scientist, UCAR/NOAA/NCEP
1990-1992   Post-Doctoral Fellowship, UCAR/NOAA/NMC
1985-1990   Graduate Research Assistant, University of Oklahoma
1980-1985   Chief, Regional Radar Center, Hydro-meteorological Institute of Serbia,
             Yugoslavia

Honors and Awards
2011-Present   CIRA Fellow
2015   NASA Group Achievement Award
2012-2016   Outstanding Lecturer at EISDA, Ewha University, South Korea

Relevant activities and accomplishments
• Principal developer of the 4DVAR data assimilation systems for NOAA/NCEP Eta-model (with D. Zupanski)

• Principal developer of the 4DVAR data assimilation systems for CSU RAMS model (with D. Zupanski and T. Vukicevic)

• Principal developer of the Maximum Likelihood Ensemble Filter (MLEF) data
   assimilation system (with D. Zupanski)

• Introduced iterative minimization in the ensemble data assimilation and one of the first
   developers of hybrid variational-ensemble data assimilation methods

• Data assimilation of precipitation-affected satellite radiances

• Strongly coupled data assimilation (w/ atmosphere, land surface, chemistry, aerosol)

• Advisor to 20+ graduate students

Selected Publications

Carrassi A, Vannitsem S, Zupanski D, Zupanski M, 2009: The Maximum Likelihood Ensemble Filter performances in chaotic systems. *Tellus*, **61A**, 587-600.

Ebtehaj AM, Zupanski M, Lerman G, Foufoula-Georgiou E, 2014: Variational data assimilation via sparse regularization. *Tellus*, **66A**, 21789.

Gao X, Wang Y, Overton N, Zupanski M, Tu X, 2017: Data-assimilated computational fluid modeling of convection-diffusion-reaction problems. *J. Comp. Sci.*, **21**, 38-59.

Park SK, Zupanski M, 2022: *Principles of Data Assimilation*, Cambridge Univ. Press, Cambridge, 398 pp.

Suzuki K, Zupanski M, 2018: Coupled data assimilation in climate research: A brief review of applications in ocean and land. *Satell. Oceanogr. Meteorol.*, **3**(2), 8p.

Wang Y, Guzik S, Zupanski M, Gao X, 2021: The Maximum Likelihood Ensemble Filter for Computational Flame and Fluid Dynamics. *IMA J. Appl. Math.*, **86**, 631-661.

Wu T-C, Zupanski M, Grasso LD, Brown PP, Kummerow CD, Knaff JA, 2016: The GSI capability to assimilate TRMM and GPM hydrometeor retrievals in HWRF. *Q. J. R. Meteorol. Soc.*, **142**, 2768-2787.

Wu TC, Zupanski M, Kliewer A, Grasso L, Grant LD, 2022: Theoretical and Practical Aspects of Strongly Coupled Aerosol-Atmosphere Data Assimilation. *Data Assimilation for Atmospheric, Oceanic, and Hydrologic Applications (Vol. IV).* S.K. Park and L. Xu, (Eds), Springer Berlin, 465-505.

Zhang SQ, Matsui T, Cheung S, Zupanski M, Peters-Lidard C, 2017: Impact of assimilated precipitation-sensitive radiances on the NU-WRF simulation of West African monsoon. *Mon. Wea. Rev.*, **145**, 3881-3900.

Zupanski D, Zupanski M, 2006: Model error estimation employing ensemble data assimilation approach. *Mon. Wea. Rev.*, **134**, 1337-1354.

Zupanski M, Kalnay E, 1999: Principles of Data Assimilation. *Global Energy and Water Cycles*, Cambridge Univ. Press. Ed. K.A. Browning and R.J. Gurney, 48-54.

Zupanski M, Zupanski D, Parrish DF, Rogers E, DiMego G, 2002: Four-dimensional variational data assimilation for the Blizzard of 2000. *Mon. Wea. Rev.,* **130**, 1967-1988.

Zupanski M, Navon IM, Zupanski D, 2008: The Maximum Likelihood Ensemble Filter as a non-differentiable minimization algorithm. *Q. J. R. Meteorol. Soc.*, **134**, 1039-1050.

Zupanski M, 1993: Regional four-dimensional variational data assimilation in a quasi-operational forecasting environment. *Mon. Wea. Rev.,* **121**, 2396-2408.

Zupanski M, 2005: Maximum Likelihood Ensemble Filter: Theoretical Aspects. *Mon. Wea. Rev.*, **133**, 1710– 1726.

Zupanski M, 2016: Reduced rank static error covariance for high-dimensional applications. *Int. J. Numer. Meth. Fluids*, **83**, 245–262.

Zupanski M, 2021: The Maximum Likelihood Filter with state space localization. *Mon. Wea. Rev.*, **149**, 3505-3524.