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Education Information

Doctorate, University of California, Davis, Civil and Environmental Engineering, United States Of America 2004 - 2007

Undergraduate, Middle East Technical University, Faculty of Engineering, Department of Civil Engineering, Turkey 1997 - 2002

Research Areas

Hydraulic, Surface Water Engineering, Hydrology, Water Resources Planning and Management, Open Channel Flow, Hydromechanics, Groundwater Engineering

Academic Titles / Tasks

Associate Professor, Middle East Technical University, Faculty of Engineering, Department of Civil Engineering, 2022 - Continues

Courses

Fluid Mechanics for Environmental, Geological, and Mining Engineers, Undergraduate, 2023 - 2024

Introduction To Groundwater Modeling, Undergraduate, 2022 - 2023

Hydromechanics, Undergraduate, 2022 - 2023

GROUNDWATER HYDRAULICS, Postgraduate, 2023 - 2024

Probabilistic Systems Analysis for Civil Engineers , Undergraduate, 2017 - 2018

Published journal articles indexed by SCI, SSCI, and AHCI

I.   **Use of one-dimensional CNN for input data size reduction in LSTM for improved computational efficiency and accuracy in hourly rainfall-runoff modeling**
      Ishida K., Ercan A., Nagasato T., Kiyama M., Amagasaki M.
      JOURNAL OF ENVIRONMENTAL MANAGEMENT, vol.359, pp.1-13, 2024 (SCI-Expanded)

II. **Multidimensional Governing Equations of Matrix Flow Component of Subsurface Stormflow as Function of Bedrock Surface Geometry**
Kavvas M. L., Tu T., ERCAN A., Chen Z.
Water Resources Research, vol.58, no.12, 2022 (SCI-Expanded)

III. **Generalizations of incompressible and compressible Navier–Stokes equations to fractional time and multi-fractional space**
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IV. **Capabilities of deep learning models on learning physical relationships: Case of rainfall-runoff modeling with LSTM**
Yokoo K., Ishida K., Ercan A., Tu T., Nagasato T., Kiyama M., Amagasaki M.
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V. **Multi-time-scale input approaches for hourly-scale rainfall-runoff modeling based on recurrent neural networks**
Ishida K., Kiyama M., Ercan A., Amagasaki M., Tu T.
JOURNAL OF HYDROINFORMATICS, vol.23, no.6, pp.1312-1324, 2021 (SCI-Expanded)

VI. **Hybrid precipitation downscaling over coastal watersheds in Japan using WRF and CNN**
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JOURNAL OF HYDROLOGY-REGIONAL STUDIES, vol.37, 2021 (SCI-Expanded)

VII. **Space and Time Fractional Governing Equations of Unsteady Overland Flow**
Kavvas M. L., Ercan A., Tu T.
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VIII. **Numerical Evaluation of Fractional Vertical Soil Water Flow Equations**
Ercan A., Kavvas M. L.
WATER, vol.13, no.4, 2021 (SCI-Expanded)

IX. **Development of high-resolution 72 h precipitation and hillslope flood maps over a tropical transboundary region by physically based numerical atmospheric-hydrologic modeling**
Trinh T., Ho C., Do N., Ercan A., Kawas M. L.
JOURNAL OF WATER AND CLIMATE CHANGE, vol.11, pp.387-406, 2020 (SCI-Expanded)

X. **Coupling hydroclimate-hydraulic-sedimentation models to estimate flood inundation and sediment transport during extreme flood events under a changing climate**
Tu T., Ercan A., Carr K. J., Kavvas M. L., Trinh T., Ishida K., Nosacka J., Brown K.
SCIENCE OF THE TOTAL ENVIRONMENT, vol.740, 2020 (SCI-Expanded)

XI. **Modeling One-Dimensional Nonreactive Solute Transport in Open Channel Flows Under Uncertain Flow and Solute Loading Conditions**
Tu T., Ercan A., Levent Kavvas M.
JOURNAL OF HYDROLOGIC ENGINEERING, vol.25, no.8, 2020 (SCI-Expanded)

XII. **Assessment of atmospheric conditions over the Hong Thai Binh river watershed by means of dynamically downscaled ERA-20C reanalysis data**
Ho C., Nguyen A., Ercan A., Kawas M. L., Nguyen V., Nguyen T.
JOURNAL OF WATER AND CLIMATE CHANGE, vol.11, no.2, pp.540-555, 2020 (SCI-Expanded)

XIII. **Hourly-scale coastal sea level modeling in a changing climate using long short-term memory neural network**
Ishida K., Tsujimoto G., Ercan A., Tu T., Kiyama M., Amagasaki M.
SCIENCE OF THE TOTAL ENVIRONMENT, vol.720, 2020 (SCI-Expanded)

XIV. **Self-similarity in fate and transport of contaminants in groundwater**
Ercan A.
SCIENCE OF THE TOTAL ENVIRONMENT, vol.706, 2020 (SCI-Expanded)

XV. **Trend analysis of watershed-scale annual and seasonal precipitation in Northern California based on dynamically downscaled future climate projections**
Ishida K., Ercan A., Trinh T., Jang S., Kavvas M. L., Ohara N., Chen Z. Q., Kure S., Dib A.

JOURNAL OF WATER AND CLIMATE CHANGE, vol.11, no.1, pp.86-105, 2020 (SCI-Expanded)

XVI.   **Probabilistic solution to two-dimensional stochastic solute transport model by the Fokker-Planck equation approach**
Tu T., Ercan A., Kavvas M. L.
JOURNAL OF HYDROLOGY, vol.580, 2020 (SCI-Expanded)

XVII.   **Fractional governing equations of transient groundwater flow in unconfined aquifers with multi-fractional dimensions in fractional time**
Kavvas M. L., Tu T., Ercan A., Polsinelli J.
EARTH SYSTEM DYNAMICS, vol.11, no.1, pp.1-12, 2020 (SCI-Expanded)

XVIII.   **Impacts of climate change on snow accumulation and melting processes over mountainous regions in Northern California during the 21st century**
Ishida K., Ohara N., Ercan A., Jang S., Trinh T., Kavvas M. L., Carr K., Anderson M. L.
SCIENCE OF THE TOTAL ENVIRONMENT, vol.685, pp.104-115, 2019 (SCI-Expanded)

XIX.   **Impacts of Climate Change on the Hydro-Climate of Peninsular Malaysia**
Amin I. M. Z. b. M., Ercan A., Ishida K., Kavvas M. L., Chen Z. Q., Jang S.
WATER, vol.11, no.9, 2019 (SCI-Expanded)

XX.   **One-dimensional solute transport in open channel flow from a stochastic systematic perspective**
Tu T., Ercan A., Kavvas M. L.
STOCHASTIC ENVIRONMENTAL RESEARCH AND RISK ASSESSMENT, vol.33, no.7, pp.1403-1418, 2019 (SCI-Expanded)

XXI.   **Reconstruction and evaluation of changes in hydrologic conditions over a transboundary region by a regional climate model coupled with a physically-based hydrology model: Application to Thao river watershed**
Ho C., Trinh T., Nguyen A., Nguyen Q., Ercan A., Kavvas M. L.
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XXII.   **Analysis of future climate change impacts on snow distribution over mountainous watersheds in Northern California by means of a physically-based snow distribution model**
Ishida K., Ercan A., Trinh T., Kavvas M. L., Ohara N., Carr K., Anderson M. L.
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XXIII.   **Integrating global land-cover and soil datasets to update saturated hydraulic conductivity parameterization in hydrologic modeling**
Trinh T., Kavvas M. L., Ishida K., Ercan A., Chen Z. Q., Anderson M. L., Ho C., Nguyen T.
SCIENCE OF THE TOTAL ENVIRONMENT, vol.631-632, pp.279-288, 2018 (SCI-Expanded)

XXIV.   **Time-space fractional governing equations of transient groundwater flow in confined aquifers: Numerical investigation**
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HYDROLOGICAL PROCESSES, vol.32, no.10, pp.1406-1419, 2018 (SCI-Expanded)

XXV.   **Evaluating the Applicability of a Two-dimensional Flow Model of a Highly Heterogeneous Domain to Flow and Environmental Management**
Carr K. J., Tu T., Ercan A., Kavvas M. L.
JOURNAL OF THE AMERICAN WATER RESOURCES ASSOCIATION, vol.54, no.1, pp.184-197, 2018 (SCI-Expanded)

XXVI.   **Assessment of the effects of multiple extreme floods on flow and transport processes under competing flood protection and environmental management strategies**
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XXVII.   **Fractal scaling analysis of groundwater dynamics in confined aquifers**
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EARTH SYSTEM DYNAMICS, vol.8, no.4, pp.931-949, 2017 (SCI-Expanded)

XXVIII.   **Fractional governing equations of transient groundwater flow in confined aquifers with multi-fractional dimensions in fractional time**
Kavvas M. L., Tu T., Ercan A., Polsinelli J.

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XXIX. **Closure to "Time-Space Fractional Governing Equations of Unsteady Open Channel Flow" by M. L. Kavvas and A. Ercan**
Kavvas M. L., Ercan A.
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XXX. **Trend analysis of watershed-scale precipitation over Northern California by means of dynamically-downscaled CMIP5 future climate projections**
Ishida K., Gorguner M., Ercan A., Trinh T., Kavvas M. L.
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XXXI. **Time-space fractional governing equations of one-dimensional unsteady open channel flow process: Numerical solution and exploration**
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HYDROLOGICAL PROCESSES, vol.31, no.16, pp.2961-2971, 2017 (SCI-Expanded)

XXXII. **Scaling Relations and Self-Similarity of 3-Dimensional Reynolds-Averaged Navier-Stokes Equations**
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SCIENTIFIC REPORTS, vol.7, 2017 (SCI-Expanded)

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SCIENCE OF THE TOTAL ENVIRONMENT, vol.586, pp.197-205, 2017 (SCI-Expanded)

XXXIV. **HYDRAULICS NEAR UNSCREENED DIVERSION PIPES IN OPEN CHANNELS: LARGE FLUME EXPERIMENTS**
Ercan A., Kavvas M. L., Carr K., Hockett Z., Bandeh H., Mussen T. D., Cocherell D., Poletto J. B., Cech J. J., Fangue N. A.
JOURNAL OF THE AMERICAN WATER RESOURCES ASSOCIATION, vol.53, no.2, pp.431-441, 2017 (SCI-Expanded)

XXXV. **Governing equations of transient soil water flow and soil water flux in multi-dimensional fractional anisotropic media and fractional time**
Kavvas M. L., Ercan A., Polsinelli J.
HYDROLOGY AND EARTH SYSTEM SCIENCES, vol.21, no.3, pp.1547-1557, 2017 (SCI-Expanded)

XXXVI. **Time-Space Fractional Governing Equations of Unsteady Open Channel Flow**
Kavvas M. L., Ercan A.
JOURNAL OF HYDROLOGIC ENGINEERING, vol.22, no.2, 2017 (SCI-Expanded)

XXXVII. **Future climate change impact assessment of watershed scale hydrologic processes in Peninsular Malaysia by a regional climate model coupled with a physically-based hydrology modelo**
Amin M. Z. M., Shaaban A. J., Ercan A., Ishida K., Kavvas M. L., Chen Z. Q., Jang S.
SCIENCE OF THE TOTAL ENVIRONMENT, vol.575, pp.12-22, 2017 (SCI-Expanded)

XXXVIII. **Investigation of the groundwater modelling component of the Integrated Water Flow Model (IWFM)**
Ercan A., Dogrul E. C., Kadir T. N.
HYDROLOGICAL SCIENCES JOURNAL-JOURNAL DES SCIENCES HYDROLOGIQUES, vol.61, no.16, pp.2834-2848, 2016 (SCI-Expanded)

XXXIX. **Self-similarity in incompressible Navier-Stokes equations**
Ercan A., Kavvas M. L.
CHAOS, vol.25, no.12, 2015 (SCI-Expanded)

XL. **Fish-protection devices at unscreened water diversions can reduce entrainment: evidence from behavioural laboratory investigations**
Poletto J. B., Cocherell D. E., Mussen T. D., Ercan A., Bandeh H., Kavvas M. L., Cech J. J., Fangue N. A.
CONSERVATION PHYSIOLOGY, vol.3, 2015 (SCI-Expanded)

XLI. **Fractional Governing Equations of Diffusion Wave and Kinematic Wave Open-Channel Flow in Fractional Time-Space. I. Development of the Equations**
Kavvas M. L., Ercan A.
JOURNAL OF HYDROLOGIC ENGINEERING, vol.20, no.9, 2015 (SCI-Expanded)

XLII. **Fractional Governing Equations of Diffusion Wave and Kinematic Wave Open-Channel Flow in**

Fractional Time-Space. II. Numerical Simulations
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XLIII. Scaling and self-similarity in two-dimensional hydrodynamics
Ercan A., Kavvas M. L.
CHAOS, vol.25, no.7, 2015 (SCI-Expanded)

XLIV. Scaling and Self-Similarity of One-Dimensional Unsteady Suspended Sediment Transport with Emphasis on Unscaled Sediment Material Properties
Carr K. J., Ercan A., Kavvas M. L.
JOURNAL OF HYDRAULIC ENGINEERING, vol.141, no.5, 2015 (SCI-Expanded)

XLV. Fractional Ensemble Average Governing Equations of Transport by Time-Space Nonstationary Stochastic Fractional Advective Velocity and Fractional Dispersion. I: Theory
Kavvas M. L., Kim S., Ercan A.
JOURNAL OF HYDROLOGIC ENGINEERING, vol.20, no.2, 2015 (SCI-Expanded)

XLVI. Fractional Ensemble Average Governing Equations of Transport by Time-Space Nonstationary Stochastic Fractional Advective Velocity and Fractional Dispersion. II: Numerical Investigation
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XLVII. Modified Water Diversion Structures Can Behaviorally Deter Juvenile Chinook Salmon from Entrainment
Mussen T. D., Cocherell D. E., Patton O., Jauregui D., Ercan A., Bandeh H., Meier D., Thomas S., Kavvas M. L., Cech J. J., et al.
TRANSACTIONS OF THE AMERICAN FISHERIES SOCIETY, vol.144, no.5, pp.1070-1080, 2015 (SCI-Expanded)

XLVIII. Can behavioral fish-guidance devices protect juvenile Chinook salmon (Oncorhynchus tshawytscha) from entrainment into unscreened water-diversion pipes?
Mussen T. D., Patton O., Cocherell D., Ercan A., Bandeh H., Kavvas M. L., Cech J. J., Fangue N. A.
CANADIAN JOURNAL OF FISHERIES AND AQUATIC SCIENCES, vol.71, no.8, pp.1209-1219, 2014 (SCI-Expanded)

XLIX. Scaling and self-similarity in one-dimensional unsteady open channel flow
Ercan A., Kavvas M. L., Haltas I.
HYDROLOGICAL PROCESSES, vol.28, no.5, pp.2721-2737, 2014 (SCI-Expanded)

L. Unscreened Water-Diversion Pipes Pose an Entrainment Risk to the Threatened Green Sturgeon, Acipenser medirostris
Mussen T. D., Cocherell D., Poletto J. B., Reardon J. S., Hockett Z., Ercan A., Bandeh H., Kavvas M. L., Cech J. J., Fangue N. A.
PLOS ONE, vol.9, no.1, 2014 (SCI-Expanded)

LI. Efficacy of a sensory deterrent and pipe modifications in decreasing entrainment of juvenile green sturgeon (Acipenser medirostris) at unscreened water diversions
Poletto J. B., Cocherell D. E., Mussen T. D., Ercan A., Bandeh H., kavvas M. L., Cech J. J., Fangue N. A.
CONSERVATION PHYSIOLOGY, vol.2, no.1, 2014 (SCI-Expanded)

LII. Assessing Juvenile Chinook Salmon Behavior and Entrainment Risk near Unscreened Water Diversions: Large Flume Simulations
Mussen T. D., Cocherell D., Hockett Z., Ercan A., Bandeh H., Kavvas M. L., Cech J. J., Fangue N. A.
TRANSACTIONS OF THE AMERICAN FISHERIES SOCIETY, vol.142, no.1, pp.130-142, 2013 (SCI-Expanded)

LIII. The impact of climate change on sea level rise at Peninsular Malaysia and Sabah-Sarawak
Ercan A., Bin Mohamad M. F., Kavvas M. L.
HYDROLOGICAL PROCESSES, vol.27, no.3, pp.367-377, 2013 (SCI-Expanded)

LIV. Ensemble Modeling of Hydrologic and Hydraulic Processes at One Shot: Application to Kinematic Open-Channel Flow under Uncertain Channel Properties and Uncertain Lateral Flow Conditions by the Stochastic Method of Characteristics
Ercan A., Kavvas M. L.
JOURNAL OF HYDROLOGIC ENGINEERING, vol.17, no.3, pp.414-423, 2012 (SCI-Expanded)

LV.   **Ensemble Modeling of Hydrologic and Hydraulic Processes at One Shot: Application to Kinematic Open-Channel Flow under Uncertain Channel Properties by the Stochastic Method of Characteristics**
Ercan A., Kavvas M. L.
JOURNAL OF HYDROLOGIC ENGINEERING, vol.17, no.1, pp.168-181, 2012 (SCI-Expanded)

LVI. **Prediction of Bank Erosion in a Reach of the Sacramento River and its Mitigation with Groynes**
Ercan A., Younis B. A.
WATER RESOURCES MANAGEMENT, vol.23, no.15, pp.3121-3147, 2009 (SCI-Expanded)

LVII. **Uncertainties in the prediction of flow in a long reach of the Sacramento River**
Ercan A., Younis B. A.
WATER AND ENVIRONMENT JOURNAL, vol.23, no.4, pp.272-285, 2009 (SCI-Expanded)

Articles Published in Other Journals

I.   **Estimating the probability density function of nonlinearstochastic processes by use of asymptotic expansions in theKubo number**
Ravaud M. M., Kavvas M. L., ERCAN A.
NONLINEAR STUDIES, vol.27, no.1, pp.1-22, 2020 (Scopus)

II.   **BİR BOYUTLU TAŞINIM SÜREÇLERİNDE ÖLÇEKLEME ANALİZİ VE KENDİNE BENZEŞİM**
ERCAN A.
Uludağ Üniversitesi Mühendislik Fakültesi Dergisi, vol.23, no.1, pp.235-246, 2018 (Peer-Reviewed Journal)

III. **Current issues in and an emerging method for flood frequency analysis under changing climate**
Kavvas M. L., Ishida K., Trinh T., Ercan A., Darama Y., Carr K. J.
HYDROLOGICAL RESEARCH LETTERS, vol.11, no.1, pp.1-5, 2017 (ESCI)

Books & Book Chapters

I.   **Long-range Dependence and Sea Level Forecasting**
ERCAN A., Kavvas M. L., Abbassov R. K.
Springer International Publishing, 2013

Refereed Congress / Symposium Publications in Proceedings

I.   **Extensions of Navier-Stokes-Euler Governing Equations of Fluid Flow to Fractional Time and Multi-Fractional Space**
Kavvas M. L., ERCAN A.
2024 World Environmental and Water Resources Congress: Climate Change Impacts on the World We Live In, Wisconsin, United States Of America, 19 - 22 May 2024, pp.105-113

II.   **Comparison of three recurrent neural networks for rainfall-runoff modelling at a snow-dominated watershed**
Yokoo K., Ishida K., Nagasato T., Ercan A., Tu T.
2021 International Conference on Geological Engineering and Geosciences, ICGoES 2021, Yogyakarta, Virtual, Indonesia, 16 - 18 March 2021, vol.851

III. **Dynamically Downscaled Precipitation over Northern California Based on CMIP5 Future Climate Projections**
Ishida K., Kavvas M., Gorguner M., Trinh T., Ercan A.
17th World Environmental and Water Resources Congress 2017, California, United States Of America, 21 - 25 May 2017, pp.374-383

IV.   **Two-Dimensional Sediment Transport Modeling under Extreme Flood at Lower Cache Creek,**

California
Tu T., Carr K. J., Ercan A., Trinh T., Kavvas M. L., Brown K., Nosacka J.
17th World Environmental and Water Resources Congress 2017, California, United States Of America, 21 - 25 May 2017, pp.83-88

V. **Assessment Study of 21st Century Drought Conditions at Shasta Dam Based on Dynamically Projected Water Supply and Water Demand**
Trinh T., Ishida K., Kavvas M., Ercan A., Carr K.
17th World Environmental and Water Resources Congress 2017, California, United States Of America, 21 - 25 May 2017, pp.421-426

VI. **Investigations of Self-Similarity and Scale Invariance of One-Dimensional Unsteady Bedload Transport**
Carr K., Ercan A., Kavvas M.
16th World Environmental and Water Resources Congress 2016: Hydraulics and Waterways and Hydro-Climate/Climate Change, Florida, United States Of America, 22 - 26 May 2016, pp.481-487

VII. **Fractional Random Walk and Fractional Differential Equation Models of Transport by Time-Space Nonstationary Stochastic Fractional Flow**
Kavvas M., Kim S., Ercan A.
16th World Environmental and Water Resources Congress 2016: Hydraulics and Waterways and Hydro-Climate/Climate Change, Florida, United States Of America, 22 - 26 May 2016, pp.535-544

VIII. **Atmospheric Model Component of an Atmospheric-Hydrological Model-Based Real-Time Flood Forecasting System for the Klzlllrmak River Basin in Turkey**
Ishida K., Ercan A., Chen R., Ohara N., Kavvas M., Dağdeviren M., Selek B.
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X. **Historical climatic and hydrologic modeling over a watershe at Peninsular Malaysia**
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World Environmental and Water Resources Congress 2015: Floods, Droughts, and Ecosystems, Texas, United States Of America, 17 - 21 May 2015, pp.1019-1025

XI. **Two-dimensional sediment transport modeling in Cache Creek Settling Basin, California**
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World Environmental and Water Resources Congress 2015: Floods, Droughts, and Ecosystems, Texas, United States Of America, 17 - 21 May 2015, pp.1851-1858

XII. **Two-dimensional unsteady flow modeling of flood inundation in a leveed basin**
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World Environmental and Water Resources Congress 2015: Floods, Droughts, and Ecosystems, Texas, United States Of America, 17 - 21 May 2015, pp.1597-1606

XIII. **Scaling and Self-Similarity of One-Dimensional Suspended Sediment Transport Equations**
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XIV. **Self-similarity in one-dimensional unsteady open channel flow through rectangular channels of varying width**
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XV. **Ensemble modeling of kinematic open channel flow under uncertain channel properties**

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XVI. **Sea level changes along the peninsular Malaysia and Sabah and Sarawak coastlines for the 21st century**

Ercan A., Kavvas M. L., Mohamad M. F.

World Environmental and Water Resources Congress 2011: Bearing Knowledge for Sustainability, Palm Springs, CA, United States Of America, 22 - 26 May 2011, pp.1292-1297

XVII. **Hydraulic and sediment transport modeling for Cache Creek Settling Basin, Woodland California**

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World Environmental and Water Resources Congress 2010: Challenges of Change, Providence, RI, United States Of America, 16 - 20 May 2010, pp.1634-1642

XVIII. **Prediction of flow and bank erosion in the Sacramento River**

Ercan A., Younis B. A.

World Environmental and Water Resources Congress 2006: Examining the Confluence of Environmental and Water Concerns, Omaha, NE, United States Of America, 21 - 25 May 2006

Activities in Scientific Journals

SCIENTIFIC REPORTS, Committee Member, 2023 - Continues
THE SCIENCE OF THE TOTAL ENVIRONMENT AN INTERNATIONAL JOURNAL FOR SCIENTIFIC RESEARCH INTO THE ENVIRONMENT AND ITS RELATIONSHIP WITH MAN, Committee Member, 2021 - Continues
JOURNAL OF HYDROLOGIC ENGINEERING, Committee Member, 2019 - Continues

Memberships / Tasks in Scientific Organizations

American Society of Civil Engineers, Associate Member, 2019 - Continues, United States Of America
Environmental and Water Resources Institute's Hydroclimate Technical Committee, Member, 2017 - Continues, United States Of America