Monday 3 December	
Workshops	**Python for Environmental Scientists – venue: Environment Canterbury, 200 Tuam St.** **Climate Change: from data to decisions – venue: NIWA, 10 Kyle St.** **Integrated Catchment Management/MIKE SHE workshop – venue: Cashel St BNZ Partners**

Tuesday 4 December					
7:30am	Registration Desk Opens				
8.30am	Official Opening – *Hon. Lianne Dalziel Mayor of Christchurch* Mihi/Welcome/Health & Safety				
9:00 – 9:45 am	Keynote Speaker: ***Bronwyn Hayward:*** *University of Canterbury* **Understanding the policy challenges of the 'Intergovernmental Panel on Climate Change' Special Report: Global Warming of 1.5ºC: The end of magical thinking**				
Room	**Auditorium**	**West Wing**	**Function room 1**	**Function room 2**	**Function room 3**
Session number/name	**1/ International governance**	**2/Fire management**	**3/Flow management**	**4/Eigen Modelling for Groundwater Level Prediction (Special Session)**	**5/NZ Water Model – Hydrology (Special Session)**
Session Chair	**Dennis Jamieson**	**James Renwick**	**Daniel Collins**	**Julian Weir**	**Christian Zammit**
10.00am - 10.20am	HIWeather New Zealand: opportunities to connect to a co-operative international research programme ***David Johnston*** *GNS Science / Massey University*	How can a stable atmosphere impact extreme fire behaviour? ***Daisuke Seto*** *University of Canterbury*	Dry weather discharges from a monitored stormwater catchment ***Ed Clayton*** *Pattle Delamore Partners*	Introduction to the Eigenmodel method for determining the dynamics of groundwater level and discharge ***Vincent Bidwell*** *Vincent Bidwell Consultancy*	Update on the New Zealand water model-hydrology project ***Christian Zammit*** *NIWA*
10.20am – 10.40am	The elusiveness of adaptive governance: some preliminary insights from the Philippines ***Sahara Brahim*** *University of Canterbury*	The Influence of Boundary Layer Turbulence to Wildfire Spread Behaviour ***Jiawei Zhang*** *University of Canterbury*	Design hyetographs in flood modelling - real or fantasy ***John Hansford*** *Tonkin + Taylor*	Eigen modelling to predict the impacts of climate and irrigation ***Helen Rutter*** *Aqualinc*	Building a finer digital river network from a hybrid Lidar-15mDEM model. ***Ude Shankar*** *NIWA*
10.40am – 11.20am	Morning Tea + Poster Session 1 – introduced by James Renwick				

Session number/name	6/Groundwater management	7/Climate & weather	8/Irrigation & drainage	9/Eigen Modelling for Groundwater Level Prediction (Special Session contd)	10/NZ Water Model – Hydrology (Special Session contd)
Session Chair	**Roland Stenger**	**Sylvia Nichol**	**Peter Davidson**	**Vince Bidwell**	**Christian Zammit**
11.20am - 11.40am	Investigation of methods to predict groundwater redox status with variable amounts of available well data ***Murray Close*** *ESR*	Digitising New Zealand and Pacific climate data: Understanding NIWA's archive and preparing for the future ***Petra Pearce*** *NIWA*	A tool to compare various irrigation scenarios approaches under diverse soil plant available water conditions ***M S Srinivasan*** *NIWA*	An Eigenmodel Approach for Groundwater Level Prediction ***Julian Weir*** *Aqualinc*	Development of a surface water isotope layer for New Zealand ***Channa Rajanayaka*** *NIWA*
11.40am – 12.00pm	The occurrence and origin of salinity in non-coastal groundwater in the Waikato region ***John Hughey*** *Waikato Regional Council*	Grouping and rankings in NIWA's climate reporting ***Gregor Macara*** *NIWA*	Determination of optimal irrigation range for rotational grazing pasture in Canterbury, New Zealand ***Birendra KC*** Aqualinc	Gda-mc^2 - estimating uncertainty bounds in the groundwater data analysis tool ***Lee Burbery*** ESR	Benchmarking in the NZ water model: What is it and why do it? ***Roddy Henderson*** *NIWA*
12.00pm – 12.20pm	Modelling lagoon response to assess future management regimes and climate scenarios ***Chris Jenkins*** Environment Southland	Comparison of sunshine measurement instruments in New Zealand ***Raghav Srinivasan*** *NIWA*	Application of WATHNET model for assessment of irrigation shortfall ***Shailesh Singh*** *NIWA*	Eigen-modelling to inform flow and water quality limits for te Waikoropupu Springs, Golden Bay ***Andrew Fenemor*** *Maanaki Whenua Landcare Research*	Progress on national surface-groundwater modelling: model development, parameterisation and regionalisation ***Jing Yang*** *NIWA*
12.20pm – 12.40pm	Making the most of long-screened wells in groundwater investigations ***David Poulsen*** *Flinders University*	The observed and simulated tropical sea breeze over the Great Barrier Reef ***Tony Bromley*** *NIWA*	A review of field drainage lysimeter research in New Zealand ***Abigail Lovett*** *Earth & Environmental Science Ltd.*	The near future of groundwater level forecasting ***Tim Kerr*** Aqualinc	Inclusion of subsurface hydraulic properties in the New Zealand Water Model-Hydrology Project ***Conny Tschritter*** *GNS Science*
12.40pm – 1.40pm	Lunch – Waterways Student Mentoring Session – West Wing Moderator: Leanne Morgan				
Room	**Auditorium**	**West Wing**	**Function room 1**	**Function room 2**	**Function room 3**
Session number/name	**11/Forecasting large weather and flood events**	**12/Catchments & communities 1**	**13/Flow forecasting**	**14/Groundwaters of NZ**	**15/Air quality + isotopes**
Session Chair	**Michael Martens**	**Andrew Fenemor**	**Doug Booker**	**Leanne Morgan**	**Richard Turner**
1.40pm – 2.00pm	Forecasting cyclones Fehi, Gita and Hola from a severe weather perspective ***Fulong Lu*** *MetService*	Achieving flood protection and multiple values in the Ōpāwaho /Heathcote River urban catchment ***Peter Christensen*** *Christchurch City Council*	The prospects for producing a reliable flood forecast: A rainfall-runoff investigation ***Magdy Mohssen*** *Otago Regional Council*	Investigating the groundwater resource beneath Wellington Harbour: A new conceptual geological analysis for hydrogeological modelling ***John Begg*** *GNS*	Examining the stable isotopic composition of water vapour over southern New Zealand ***David Pollard*** *NIWA*
2.00pm – 2.20pm	Where science & communication meet - focusing on severe weather events ***Lisa Murray*** *MetService*	RMA plan review as hypothesis testing – a socio-hydrology perspective ***David Scott*** *ESR*	Data assimilation for a hydrological flood forecasting model ***Greg Whyte*** *DHI Water & Environment*	Investigating the groundwater resource beneath Wellington harbour: Exploration activities and hydrogeological analysis ***Mark Gyopari*** *Earth In Mind*	Between two oceans: Auckland's urban aerosol ***Guy Coulson*** *NIWA*

Room	Auditorium	West Wing	Function room 1	Function room 2	Function room 3
Session number/name	**11/Forecasting large weather and flood events**	**12/Catchments & communities 1**	**13/Flow forecasting**	**14/Groundwaters of NZ**	**15/Air quality + isotopes**
Session Chair	**Michael Martens**	**Andrew Fenemor**	**Doug Booker**	**Leanne Morgan**	**Richard Turner**
2.20pm – 2.40pm	Comprehensive approach to flood frequency analysis ***David Leong*** *Tonkin & Taylor*	Christchurch Rivers and their Communities. Swamp to City ***Hugh Thorpe*** *Independent*	NZ Water Model—river flow forecasting ***Celine Cattoen*** *NIWA*	Assessing subsurface drainage of the Kaimaumau Peatlands ***Sean Berry*** *Soil & Rock Consultants*	A pilot study of aerosol concentrations at two locations near Cook Strait ***Sally Gray*** *NIWA*
2.40pm – 3.00pm	Regional flood estimation tool for New Zealand ***Roddy Henderson*** *NIWA*	Restoring the Taniwha Spring: A partnership project between Rotorua Lakes Council and Ngati Rangiwewehi ***Clare Maginness*** *Pattle Delamore Partners*	Assessing drivers of ensemble flood forecasting uncertainties during ex-Cyclone Debbie ***Kelsey Montgomery*** *NIWA*	Groundwater flow model development for the Rangitaiki, Tarawera and Whakatane water management areas ***Mauricio Taulis*** *Jacobs*	An online tool to guide orchardists outdoor burning activities ***Kathleen Kozyniak*** *Hawke's Bay Regional Council*
3.00pm – 3.20pm	The world catalogue of floods – are these floods outliers? ***Rob Connell*** *Independent*	Barriers to the uptake of building-scale water sensitive urban design technologies in Christchurch ***Vicky Southworth*** *University of Canterbury*	Assessing the impact of model simplification on river flow reliability predictions: a synthetic example ***Channa Rajanayaka*** *NIWA*	Groundwater allocation regime for all catchments in the Bay of Plenty region 2005 - 2018 ***Paul White*** *GNS science*	A quantitative analysis of Auckland's atmospheric boundary layer in relation to brown haze ***Hannah Marley*** *University of Auckland*
3.20pm – 4.00pm	Afternoon Tea + Poster Session 2 – introduced by Leanne Morgan				
Room	**Auditorium**	**West Wing**	**Function room 1**	**Function room 2**	**Function room 3**
Session number/name	**16/Rainfall mapping**	**17/ Managed aquifer recharge**	**18/Antarctic weather & climate**	**19/Climate change**	**20/Groundwater contaminants and transport**
Session Chair	**Tim Kerr**	**Lisa Scott**	**Jim Salinger**	**James Renwick**	**Lee Burbery**
4.00pm – 4.20pm	Enhancing VCSN rainfall estimates for hydrological modelling ***Andrew Tait*** *NIWA*	Managed aquifer recharge as a tool for supporting the balance between environmental demands and agriculture: a case study in the Walla Walla basin, USA ***Jake Scherberg*** *Williamson Water Advisory*	Controlled meteorological balloons over Ross Sea Polynyas ***Ethan Dale*** *University of Canterbury*	Effects of climate change and water resource limits on Wairarapa Valley water resources. ***Andrew Dark*** *Aqualinc*	Tracking groundwater contamination using DNA tracers ***Liping Pang*** *ESR*
4.20pm – 4.40pm	Rain radar nowcasting for small catchment hydrology in New Zealand using steps ***Luke Sutherland-Stacey*** *Weather Radar New Zealand*	Integrated water management in the Hekeao/Hinds Plains utilising the tools of managed aquifer recharge ***Bob Bower*** *WGA*	Remote sensing of the McMurdo dry valley micro-climates and their hydrological impacts ***Rajasweta Datta*** *University of Canterbury*	Potential hydropower generation under future climate change ***Daniel Collins*** *NIWA*	Plan change 2 - what it means for nutrient management and farming ***Stephen Collins*** *Horizons Regional Council*
4.40pm – 5.00pm	Spatial and temporal difference between rain radar and rain gauges, implications for Canterbury ***Geoff Austin*** *University of Auckland*	Estimation of the five-year impact of the Hinds MAR trial on groundwater levels and quality ***Patrick Durney*** *Waterways Centre, Canterbury University*	Changes in Southern Hemisphere precipitation patterns through the 21st century in global chemistry-climate models ***Laura Revell*** *University of Canterbury*	Modelling the flow-on effects of climate change: Marokopa, NZ ***Raiatea Barlow Kameta*** *Victoria University of Wellington*	High resolution nitrate monitoring - joining the dots ***Phillip Abraham*** ESR
5.00pm – 5.20pm	On the sensitivity of urban catchment response to the different precipitation sources ***Nikhil Garg*** *CSIRO Data61*	Forecasting recharge rates for MAR infiltration basins ***Cameron Jasper*** *Pattle Delamore Partners*	Consistency of surface winds in multiple reanalyses products over the ross sea/ross ice shelf ***Adrian McDonald*** *University of Canterbury*	Mapping grapevine-climate relationships at high resolution in vineyard regions in the context of climate change ***Andrew Sturman*** *University of Canterbury*	Measuring actual denitrification to understand nitrogen loads through aquifers ***Heather Martindale*** *GNS Science*
6:00pm – 8:00pm	Welcome Function – University of Canterbury Staff Club (Ilam House)				

Wednesday 5th December					
	Registration Desk Opens				
8.30am – 9.15am	Keynote Speaker: ***John Crouch*** – *MetService* **South Island West Coast Rainfall – A Polarimetric Radar View**				
9.15am – 9.25am	Housekeeping and Notices				
Room	**Auditorium**	**West Wing**	**Function room 1**	**Function room 2**	**Function room 3**
Session number/name	**21/International governance and policy**	**22/Earth systems & processes**	**23/Rainfall & flow forecasting**	**24/ Waimakariri Special Session**	**25/Climate processes**
Session Chair	**Michael Butts**	**Tony Bromley**	**David Leong**	**Zeb Etheridge**	**Petra Pearce**
9.30am – 9.50am	The role of anthropogenic forcing in extreme rainfall during early March 2014 in Christchurch ***Ben Nistor*** *Victoria University of Wellington*	Plankton to planetary waves, simulating the 'earth system' **Jonny Williams** NIWA	Decision-making using rainfall forecasts from multiple models ***Trevor Carey-Smith*** *NIWA*	Investigating the fate and transport of groundwater nitrate in the Silverstream catchment, North Canterbury ***Lee Burbery*** *ESR*	A convective-scale reanalysis for New Zealand ***Stuart Moore*** *NIWA*
9.50am – 10.10am	Spatially explicit analysis of water scarcity levels related to agricultural policy in Brazil ***Markus Pahlow*** *University of Canterbury*	Evaluation of HadGEM3 Southern Ocean cloud using observations and reanalyses ***Peter Kuma*** *University of Canterbury*	Statistical models forecasting daily river flows for operational use in a Hydroelectricity catchment ***Jen Purdie*** *Meridian Energy Ltd*	Understanding nitrate transport pathways in the Waimakariri – Christchurch area: insights from well data ***Henry Dillon*** *Golder Associates*	Where does our water come from - and how does it get here? ***Daniel Kingston*** *University of Otago*
10.10am - 10.30am	Cimate Modelling under the Deep South National Science Challenge: a status update ***Olaf Morgenstern*** *NIWA*	Forecasting the aerial spread of myrtle-rust (austropuccinia psidii) to New Zealand from Australia, New Caledonia and Raoul Island. ***Richard Turner*** *NIWA*	Short-term reservoir inflow forecasting, modelling water availability for the Clutha hydro power scheme ***Amy Waters*** *University of Waikato*	Collaborative development of a stochastic groundwater model of the Waimakariri – Christchurch Aquifer System ***Zeb Etheridge*** *Environment Canterbury*	Modelling glacial mass balance with an enhanced temperature-index model ***Hamish Prince*** *Otago University*
10.30am - 11.10am	Morning Tea + Poster Session 3 – introduced by Michael Martens				

Room	Auditorium	West Wing	Function room 1	Function room 2	Function room 3
Session number/name	**26/Snow**	**27/Weather monitoring & prediction**	**28/Groundwater quality**	**29/ Waimakariri Special Session contd**	**30/Hydrology**
Session Chair	**Sarah Mager**	**Luke Sutherland-Stacey**	**Eric Van Nieuwkerk**	**Zeb Etheridge**	**James Griffiths**
11.10am - 11.30am	Resolving controls on snow distribution in the Pisa Range, New Zealand ***Lucy Just*** *Otago University*	New Zealand gust climatology part ii: revising New Zealand regional wind speeds ***Amir A. Safaei Pirooz*** *The University of Auckland*	Impacts of on-site sewage management in Glenorchy - piecing together the puzzle ***Alexandra Badenhop*** *e3Scientific*	End-member mixing analysis of recharge sources in the Christchurch Aquifer System ***Lisa Scott*** *Environment Canterbury*	Estimating actual evapotranspiration from a raingarden using the Bowen ratio energy balance method ***Tingting Hao*** *University of Auckland*
11.30am – 11.50am	The snowpack energy balance and drivers of snowmelt in the Australian Alps ***Shane Bilish*** *Snowy Hydro*	Time sequential thermography for spatial turbulence measurements ***Marwan Katurji*** *University of Canterbury*	Use of sonication to better sample attached microbes from groundwater systems ***Louise Weaver*** *ESR*	Calibration-constrained uncertainty analysis of groundwater flow and contaminant transport models for the Waimakariri-Ashley region ***Brioch Hemmings*** *GNS Science*	The influence of storm origin, intensity, and duration on runoff processes in tussock grasslands in eastern Otago ***Sarah Mager*** *University of Otago*
11.50am – 12.10pm	Snow hydrology of the southern alps: A review ***Rasool Porhemmat*** *University of Canterbury*	Km-scale numerical weather prediction and ensemble methods – problems, solutions, examples and future prospects ***Michael Martens*** *Metservice*	The onshore influence of offshore fresh groundwater - a global-scale analysis ***Leanne Morgan*** *Waterways Centre for Freshwater Management*	Source zone delineation for nitrate management in the Waimakariri and Christchurch Aquifer System ***Zeb Etheridge*** *Environment Canterbury*	Using predictive uncertainty analysis to optimise data acquisition for stream depletion predictions ***Tess Op Den Kelder*** *GNS Science*
12.10pm – 12.30pm	Characteristics and controls of snow cover variability in the Clutha catchment, revealed by remote sensing ***Todd Redpath*** *University of Otago*	Calibration of a Scanning X-Band Rain Radar with a Vertically Pointing Doppler Ku-Band Rain Radar ***Andrew Coffin*** *University of Auckland*	Effect of varying flowpath contributions on longitudinal baseflow stream chemistry patterns ***Roland Stenger*** *Lincoln Agritech*	We've been really clever and built a stochastic model. Now, how do we make resource management decisions with the results? ***Zeb Etheridge*** *Environment Canterbury*	New Zealand SWAT: sediment model implementation ***Aroon Parshotam*** *Aqualinc*
12.30pm – 1.30pm	Lunch				
1.30pm – 3.00pm	Special poster session – all presenters required to be at their posters – introduced by Abi Lovett				
3.00pm – 3.20pm	Afternoon Tea				

Room	Auditorium	West Wing	Function room 1	Function room 2	Function room 3
Session number/name	**31/Protecting drinking water**	**32/Contaminant monitoring & modelling**	**33/Hydrological monitoring**	**34/ Hydrological Modelling & Floods**	**35/ Groundwater**
Session Chair	**Laura Banasiak**	**Abi Lovett**	**Roddy Henderson**	**Celine Cattoen-Gilbert**	**Bob Bower**
3.20pm – 3.40pm	Did Havelock North's 2016 drinking water contamination transform business owners' perspective of water? ***Rachel Teen*** *Waterways Centre Freshwater Management*	Natural background nutrient yields in the Ruamahanga river catchment - a comparison of overseer and instream water quality derived nutrient generation yields for native forest catchments ***Kate Clay*** *Jacobs Engineering*	The Internet of things – what we did, what worked, and what didn't ***Rodney McKay*** *NIWA*	LiDAR resolution for flood models ***Graeme Smart*** *NIWA*	A probabilistic model of aquifer susceptibility to earthquake-induced groundwater-level changes ***Konrad Weaver*** *Victoria University of Wellington*
3.40pm – 4.00pm	Protection of drinking water sources under multi-barrier risk based approaches following the Havelock North outbreak ***Tony Cussins*** *Tonkin + Taylor*	Hydrograph separation and nutrient load prediction using monthly stream phosphorus and nitrogen data ***Simon Woodward*** *DairyNZ*	Monitoring and modelling river landscapes with unmanned airborne vehicles (UAV's) ***Michael Butts*** *DHI Water & Environment*	Using ecological infrastructure to reduce flooding ***Deborah Maxwell*** *Victoria University of Wellington*	Groundwater flow and transport model simplifications using equilibrium water table and particle pathline methods ***Mike Toews*** *GNS Science*
4.00pm – 4.20pm	The use of simple tools for managing risks to wellfields ***Katy Grant*** *Pattle Delamore Partners*	Export of nitrogen and phosphorus from subsurface drained dairy pastures on the Hauraki Plains ***Greg Barkle*** *Aqualinc*	Monitoring; for what purpose? ***Nicole Calder-Steele*** *Environment Canterbury*	Utility of satellite data for hydrological modelling ***James Griffiths*** NIWA	Groundwater availability of the Franklin Deep Waitemata Aquifer using FEFLOW modelling and flow-net analysis ***Philip Kelsey*** *Earthtech Consulting*
4.20pm – 4.40pm	Optimising the performance of an in-stream woodchip denitrifying bioreactor under uncertain hydrological conditions **Theo Sarris** *ESR*	The influence of unsaturated zone drainage status on shallow groundwater redox conditions in Reporoa basin ***Juliet Clague*** *Lincoln Agritech Ltd*	Chemical composition of alpine rivers in the southern alps, New Zealand ***Sophie Horton*** *University of Otago*	"Looped Rating"effect in Whanganui River rated flows ***Graham Macky*** *Macky Fluvial Consulting Ltd*	Optimising water management based on understanding of flow sources, pathways and lags **Uwe Morgenstern** *GNS*
5.00pm – 6.00pm	NZHS AGM | Auditorium, La Vida || MSNZ AGM | West Wing Room, La Vida				
From 7.00pm	ENVCO Student Function | Joes Garage, 7 Leslie St, Riccarton				

Thursday 6th December					
	Registration Desk Opens				
8.30am – 9.15am	**Keynote Speaker: *Simon Cox - GNS Science*** **Water And The Hydrological Cycle – The Source Of Life, But A Major Driver Of Future Hazards**				
9.15 – 9.20 am	Housekeeping and Notices				
9:20-9:50 (6-min orals)	***SPECIAL SHORT PRESENTATION SESSION*** Stochastic artefacts - unexpected images ***David Scott*** *ESR* Water the effects of undocumented stopbanks? ***Thomas Wallace*** *University of Canterbury* Developing a new class of pathogen surrogates for water applications ***Liping Pang*** *ESR* Hydrology sounds interesting ***Graeme Smart*** *NIWA*				
Room	**Auditorium**	**West Wing**	**Function room 1**	**Function room 2**	**Function room 3**
Session number/name	**36/Mapping NZ geology**	**37/Groundwaters of NZ**	**38/Shallow groundwater dynamics**	**39/Groundwater modelling**	**40/Hydrology**
Session Chair	**Theodora Avanidou**	**David Scott**	**Hugh Thorpe**	**Channa Rajanayaka**	**Deborah Maxwell**
10.00am – 10.20am	The data, or the geology? A multi-model analysis of solute transport in synthetic braided-river deposits. ***Jeremy Bennet*** *University of Tübingen / Tonkin + Taylor*	Aquiferwatch – towards an operational tool to predict Wairau plain aquifer depletion ***Thomas Wöhling*** *Technische Universität Dresden / Lincoln Agritech*	Understanding the dynamics of shallow groundwater: the Christchurch experience ***Helen Rutter*** Aqualinc	A modelling tool for real-time nitrate-loading optimization under uncertainty: the stochastic impulse-response emulator ***Matthew Knowling*** *GNS Science*	Lake Taupo storage: Is it needed? ***Earl Bardsley*** *University of Waikato*
10.20am – 10.40am	Laboratory studies of mixing between an open framework gravel channel and a permeable reactive barrier ***Laura Banasiak*** *ESR*	Utility assessment of reduced order models (ROMs) as surrogates for the Wairau Plain groundwater model ***Moritz Gosses*** *Tu Dresden*	Subsurface flowpaths of Christchurch springs ***Michael Stewart*** *Aquifer Dynamics & GNS Science*	Gisborne managed aquifer recharge project - Stage 2 injection trial ***Eric van Nieuwkerk*** *Golder Associates*	Partial area contribution and overland flow discontinuity in arid and semi arid zones ***Hanoch Lavee*** *Bar-ilan University*
10.40am - 11.20am	Morning Tea + Poster Session 4 – introduced by Adam Martin				
Room	**Auditorium**	**West Wing**	**Function room 1**	**Function room 2**	**Function room 3**
Session number/name	**41/Applied Hydrology**	**42/Extreme events**	**43/Groundwater quality**	**44/Groundwater management**	**45/ Water Allocation and Environmental Flows**
Session Chair	**Joseph Thomas**	**Lisa Murray**	**Brioch Hemmings**	**Magali Moreau**	**Jon Williamson**
11.20am – 11.40am	Application of Gibbs' model to drainage networks and its implication on flood mitigation in urban catchments ***Yongwon Seo*** *Korean Water Resource Association*	Investigating New Zealand's droughts in the 20th and 21st centuries ***Abha Sood*** *NIWA*	Denitrification rate inputs to groundwater models ***Theo Sarris*** *ESR*	Groundwater supply protection zones in France: Case study and perspectives in New Zealand ***Frederika Mourot*** *GNS Science*	A new approach to substrate mapping: supporting high resolution habitat suitability assessments for environmental flows ***Jo Hoyle*** *NIWA*
11.40am – 12.00pm	You don't have to visit a river to know its hydraulics ***Doug Booker*** *NIWA*	Two unprecedented marine and land heatwaves in New Zealand: Summers of 1934/35 and 2017/18 compared ***Brett Mullan*** *NIWA*	Determining sources of nitrate using nitrogen isotopes in the Tinwald, Ashburton area ***Philippa Aitchison-Earl*** *Environment Canterbury*	Understanding groundwater dynamics from tritium and ^{18}O in coastal Wairau plain aquifer; NZ ***Peter Davidson*** *Marlborough District Council*	River flow vs waves: processes controlling river mouth lagoon dynamics ***Richard Measures*** *NIWA*
12.00pm – 12.20pm	A Study on the Development of Loss Function for the Transportation	Why did the Clutha have record flows in 1957/58? ***James Renwick***	Earthquake-induced aquifer leakage exacerbated manifestation of liquefaction in	Groundwater dynamics in the coastal Wairau plain aquifer ***Uwe Morgenstern*** *GNS Science*	Assessing the impact of over-allocation on the flow regime: Raparapawai stream case study

Room	Auditorium	West Wing	Function room 1	Function room 2	Function room 3
Session number/name	**41/Applied Hydrology**	**42/Extreme events**	**43/Groundwater quality**	**44/Groundwater management**	**45/ Water Allocation and Environmental Flows**
Session Chair	**Joseph Thomas**	**Lisa Murray**	**Brioch Hemmings**	**Magali Moreau**	**Jon Williamson**
	Facilities in South Korea ***Shinbum Hwang*** *Sangji University*	*Victoria University of Wellington*	Christchurch, New Zealand ***Simon Cox*** *GNS Science*		***Raelene Mercer*** *Horizons Regional Council*
12.20pm – 12.40pm	Bucket science in the barn [soil hydraulic conductivity] ***David Painter*** *DPC*	Southern alps snow and ice losses for summer 2017/18: From remote sensing and modelling ***Jim Salinger*** *University of Haifa*	Water management ki uta ki tai for the Selwyn river system ***Brett Painter*** *Environment Canterbury*	Stochastic response function for stream depletion assessment - practical implementation in Hawke's Bay ***Pawel Rakowski*** *Hawkes Bay Regional Council*	Groundwater Sourced Air Conditioning Systems in the Christchurch CBD ***Nic Love*** *Pattle Delamore Partners*
12.40pm – 1.00pm	To calibrate or not to calibrate? That is the question! ***Dirk van Walt*** *Van Walt*	Uncertainties in historical changes and future projections of drought ***Tianbao Zhao*** *Chinese Academy Of Sciences*	Catchment scale surface water management in the Waimakariri Water Zone ***Carey Lintott*** *Beca*	Pump testing an unconfined sand aquifer, Mahia, Hawke's Bay ***Amir Levy*** *Lattey Group*	Stream bank erosion as a result of socio-economic goals and why we should think more broadly ***Tim Ellis*** *Environment Southland*
1.00pm – 1.50pm	Lunch				
Room	**Auditorium**	**West Wing**	**Function room 1**	**Function room 2**	**Function room 3**
Session number/name	**46/Instrumentation in hydrology**	**47/Climate processes**	**48/Groundwater quality**	**49/Groundwater modelling**	**50/Surface and Groundwater Hydrology**
Session Chair	**Richard Measures**	**Trevor Carey-Smith**	**John Hadfield**	**Jeremy Bennett**	**Ed Clayton**
1.50pm – 2.10pm	A new instrument for measuring in-situ suspended sediment concentration and size grading in rivers ***Murray Hicks*** NIWA	Investigation of the two wind peaks in the upper troposphere and lower stratosphere during deepwave **Ed-Yang Yang** *NIWA*	Sampling groundwater macro-fauna – what does it tell us? ***Annette Bolton*** *ESR*	Water quality model performance evaluation methods ***Jon Williamson*** *Williamson Water Advisory*	Waitohi Catchment Integrated Groundwater and Surface Water Investigation ***Bas Veendrick & Neil Thomas*** *Pattle Delamore Partners*
2.10pm – 2.30pm	Automatic discharge measurement of lowland weedy streams ***Jeremy Bulleid*** *NIWA*	Evaluating New Zealand's agricultural methane emissions ***Alexander Geddes*** *NIWA*	Working Towards Establishing a NZ Groundwater Superfun Site?!? ***Lee Burbery*** *ESR*	Waimapu Stream (Tauranga) - The Perils of Extra Calibration ***Philip Wallace*** *DHI Water & Environment*	Design and impact assessment of coastal wetland using an integrated catchment model ***Dragan Tutulic*** *DHI Water & Environment*
2.30pm – 2.50pm	Determining groundwater flow paths and velocities using electrical resistivity tomography with salt tracer injection ***Richard Mellis*** *Southern Geophysical*	Zero Carbon Bill - does methane deserve a reprieve? ***Ben Liley*** *NIWA*	Emerging organic contaminants in New Zealand groundwaters: pilot assessment in the Waikato Region ***Magali Moreau*** *GNS Science*	The effect of pilot points location on calibration results ***Husam Baalousha*** *Hamad Bin Khalifa University*	Optimized Rakaia River management through modelling its flow regime and interaction with its water users ***Wilco Terink*** *Environment Canterbury*
2.50pm – 3:10pm	Afternoon Tea				

Room	*Auditorium*	West Wing	*Function room 1*	*Function room 2*	*Function room 3*
Session number/name	**51/Catchment & communities**		**52/Hydrological tools**		**53/Groundwater quality**
Session Chair	**Rachel Teen**		**Markus Phalow**		**Frederika Mourot**
3.10pm – 3.30pm	Increasing Community Resilience by Establishing Emergency Water Bores in Fractured Greywacke ***Vanessa Dally*** *Cardno NZ*		Using traditional statistical tools in the big data era: managing groundwater level variations in wetlands ***Theodora Avanidou*** Beca		Beneath the surface: Estimating sedimentation in a water reservoir ***Ryan Nicol*** *Pattle Delamore Partners*
3.30pm – 3.50pm	Using vulnerability assessments to design "big river" flow studies in catchments involving multiple Hapu ***Gail Tipa*** *Tipa and Associates Ltd*		From stochastic airborne EM inversion to geologic model: Application of a two-step machine learning workflow ***Michael Friedel*** *Lincoln Agritech*		Does a quickflow component improve the representation of nitrate transfers in the Reporoa basin? ***Mark Flintoft*** *Aqualinc*
3.50pm – 4.00pm	*Conference Close and spot prize awards – attendees must be present to claim a prize*				
6.30pm	Conference Dinner – Christchurch Art Gallery – buses depart 6pm				

Friday 7th December	
9.00am	Field Trips – depart La Vida car park
	See website for details

POSTER SESSIONS

Please check the poster programme below. You will find a poster number allocated to each poster presenter, as well as a session number. During each session the presenters listed will be available at their poster for discussion and questions. In addition to the following poster sessions, there will also be a Special Poster Session on Wed 5 Dec from 1.30 – 3.00pm, where all poster presenters will be available.

Poster session 1: Tuesday 4 December 10.40am – 11.20am

This session will be introduced by James Renwick.

Presenting Author	Organisation	Poster #	Paper Title	Theme
Tony Bromley	NIWA	55	Condensation nuclei and aerosol optical depth measurements through the western Pacific Ocean	Air Quality and Isotopes
Andrew Coffin	NIWA	2	The micrometeorology of houses: the Clausius-Clapyron equation at work in the attic.	Data: monitoring, visualisation and management
Trevor Carey-Smith	University Of Auckland	7	High Intensity Rainfall Design System Version 4	Extremes Events
Daniel Collins	NIWA	8	Progress in estimating flood frequency, extent, and certainty in a changing climate	Extremes Events
Sally Gray	NIWA	1	Determining the source regions of condensation nuclei variations off the North Island's west coast	Air Quality and Isotopes
Marwan Katurji	University of Canterbury	9	Atmospheric turbulence at the fire front	Extremes Events
Jane McMecking	Otago Regional Council	10	Risk Assessment of Potential Woody Debris Incorporated in Floodwaters in Otago	Extremes Events
Magali Moreau	GNS Science	3	A national classification for New Zealand hydrogeological systems	Data: monitoring, visualisation and management
Oliver Cameron	Beca	20	Evaluating Accuracy of Continuous Runoff Modelling	Data: monitoring, visualisation and management
Hoa Pham	NIWA	12	Drought in western Northland: A regional and local analysis	Extremes Events
Katrina Richards	Meteorological Society Of New Zealand	11	Two ex-cyclones and coastal saltwater inundation in Mapua, New Zealand in February 2018	Extremes Events
Amir A. Safaei Pirooz	The University Of Auckland	4	New Zealand Gust Climatology Part 1: A robust homogenisation algarithm and long-term gust speed trends	Data: monitoring, visualisation and management
Vanessa Trompetter	GNS Science	5	Creating a Groundwater Isoscape for New Zealand	Data: monitoring, visualisation and management
Dr. Yang Yang	NIWA	6	Bias correction for simulated soil moisture using model output statistics (MOS)	Weather and hydrological forecasting

Poster session 2: Tuesday 4 December 3.20pm – 4.00pm

This session will be introduced by Leanne Morgan.

Presenting Author	Organisation	Poster #	Paper Title	Theme
Greg Barkle	Aqualinc Research Ltd	13	Determining the vertical variation of hydraulic properties in the shallow groundwater zone	Groundwaters of New Zealand
Jeremy Bennett	University Of Tübingen, Tonkin + Taylor	14	Using sedimentological concepts to generate hydrogeological virtual realities	Groundwaters of New Zealand
Michael Butts	DHI Water & Environment Denmark	15	Using different model structures in integrated (surface water - groundwater) hydrological modelling	Groundwaters of New Zealand
Juliet Clague	Lincoln Agritech Ltd	16	Reducing nitrate discharges from artificial drainage with woodchip bioreactors	Groundwaters of New Zealand
Katie Coluccio	Waterways Centre for Freshwater Management	17	Groundwater Seepage in Te Waihora/Lake Ellesmere	Groundwaters of New Zealand
Simon Cox	GNS Science	18	Groundwater induced surface deformation in the central Southern Alps, New Zealand	Groundwaters of New Zealand
Connie Daws	University Of Waikato	19	Factors contributing to the unnaturally low water table of Moanatuatua Scientific Reserve, Waikato, New Zealand.	Groundwaters of New Zealand
Kosuke Nagano	University of Tsukuba, Japan	21	Factors causing temporal change of spring water age in a headwater catchment in Japan	Groundwaters of New Zealand
Rob van der Raaij	GNS Science	23	Radiocarbon ages of groundwaters in South Canterbury	Groundwaters of New Zealand
Louise Weaver	ESR	29	Considerations for developing a Groundwater Health Index	Groundwaters of New Zealand
Jing Yang	NIWA	24	Assessing the impact of groundwater take scenarios on lowflow using Topnet-GW	Groundwaters of New Zealand
Greg Whyte	DHI Water & Environment NZ	25	The study of water resources optimized allocation and regulation in pearl river delta	Groundwaters of New Zealand

Poster session 3: Wednesday 5 December 10.30 – 11.10am

This session will be introduced by Michael Martens.

Presenting Author	Organisation	Poster #	Paper Title	Theme
Mazhar Ali	Jacobs	30	Application of SCS Synthetic rainfall distributions to an unguaged catchment: A case study	Modelling, prediction, and data assimilation
Morgan Bennet	University Of Otago	27	Detecting a climate change signal in New Zealand aridity	Large-scale climate variability and change
Tim Ellis	Environment Southland	28	Resilience thinking, climate change and the leakiness of Southland's landscapes	Large-scale climate variability and change
Michael Friedel	Lincoln Agritech Ltd	32	Predicting NZ groundwater redox status: Machine-learning considerations and preliminary results	Modelling, prediction, and data assimilation
James Griffiths	NIWA	33	A simplified approach to groundwater model calibration	Modelling, prediction, and data assimilation
Sylvia Nichol	NIWA	26	Dobson Spectrophotometer #17: Past, present, future	History of hydrological and atmospheric sciences in NZ
Alex Schuddeboom	University Of Canterbury	34	Using Cloud Clusters to Analyze the Impacts of Changing Model Parameters	Modelling, prediction, and data assimilation
Mr Jayandra Shrestha	University Of Canterbury	35	Development and application of a hydropower reservoir routine for the soil and water assessment tool	Modelling, prediction, and data assimilation
Vidya Varma	NIWA	36	Tuning of atmospheric ice formation processes and their impact on cloud-radiation biases in NZESM	Modelling, prediction, and data assimilation
Julian Weir	Aqualinc	37	An Inventory of Catchment-Scale Groundwater Models in New Zealand	Modelling, prediction, and data assimilation
Thomas Wöhling	Technische Universität Dresden, Lincoln Agritech	38	The challenge of multi-purpose groundwater monitoring networks - illustrated on the Wairau Plain Aquifer	Modelling, prediction, and data assimilation

Special Poster Session: Wednesday 5 December 1.30pm – 3.00pm
ALL poster presenters are expected to be at their posters for this session

Poster session 4: Thursday 6 December 10.40am – 11.20am

This session will be introduced by Adam Martin.

Presenting Author	Organisation	Poster #	Paper Title	Theme
Tony Bromley	NIWA	52	Developing a high-precision measurement technique for nitrous oxide isotopomers in air	Environment Flows
Michael Butts	DHI Water & Environment Denmark	46	Combining a screening tool and integrated modelling for effective nitrate management at the catchment scale	Water quantity and quality
Callum Douglas	University Of Waikato	50	Down the drain: Measuring the degradation and recovery of a drained wetland remnant	Irrigation and Drainage
Hamish Graham	Environment Canterbury	54	Pathways for nutrient contamination of Barkers Creek, South Canterbury	Water quantity and quality
Lee Heesup	Hanseo University	44	Detailed flood vulnerability assessment of coastal urban areas using flood Inundation maps	Water Management
Birendra KC	Aqualinc Research Ltd	51	Impacts of dairy farming systems on water quantity and quality: International comparison	Irrigation and Drainage
Mohammed Majeed	Manukau Institute Of Technology	39	A multi-use seasonal pumped hydro storage scheme for New Zealand?	Water Management
Muhammad Majeed	Waikato University	47	Toward and approach for estimating evaporation reduction from future windbreaks	Water quantity and quality
Juliet Milne	NIWA	53	Research and tools for informing environmental flow requirements	Environment Flows
Magali Moreau	GNS Science	40	Bacterial community composition of NZ groundwater, predicted metabolic profiles and relationships to hydrochemistry and hydro-characteristics	Water Management
Helen Rutter	Aqualinc Research Ltd	41	Infiltration galleries: The good, the bad and the ugly	Water Management
Mark Scaife	University of Canterbury	48	Characterising seawater intrusion within the Christchurch shallow coastal aquifer in the vicinity of Lake Kate Sheppard	Water quantity and quality
Roland Stenger	Lincoln Agritech	49	Estimating catchment-scale flowpaths contributions based on widely available geospatial data	Water quantity and quality
Paul White	GNS Science	42	Kaitiaki flows: Iwi-led science to identify spring-fed stream management regimes, Awahou Stream Rotorua	Water Management
Paul White	GNS Science	43	Human Behaviours and Water Management	Water Management
Song Youngseok	Hanseo University	45	A study on calculation for rate of future IDF curve considering uncertainty analysis technique	Water Management