



Groundwater Training



Introduction

Hydrological Training Programme - Suva, 4th - 22nd April 2005

Week 2:	Groundwater Hydrology				
	Monday 11-Apr	Tuesday 12-Apr	Wednesday 13-Apr	Thursday 14-Apr	Friday 15-Apr
	Introduction	Field trip to Makuluva	Debrief and analysis of data from field trip - Discussion - Excel processing - Telemetry download	Groundwater development	Water quality assessment & monitoring
	Island groundwater - overview				
1000 - 1030	Break			Break	
	GW assessment (investigations & monitoring)		Continued	Groundwater monitoring & management	Water quality - practical
	Salinity testing - practical			Discussion Case studies	Water quality - assignment
1230 - 1330	Lunch			Lunch	
	Preparation for 1st field trip to Makuluva		GW investigation and monitoring - detail	Groundwater recharge - introduction	Parallel sessions on Windows and Excel
	Exercise - Prepare work plan - Equipment list		Databases - examples - exercise	Groundwater recharge - water balance	
1500 - 1530	Break				
	Joint session - present plan - loggers & telemetry		Joint session - Sea level recording - Exercise	Groundwater recharge - assignment	Continued
	Preparation of equipment			Review	

Outline Programme

Monday 11th April (0830 start, 1700 finish)

Morning

Introduction

Intro to program for next 2 weeks

Island groundwater – overview

- Types of groundwater systems
- Factors affecting groundwater resources
- Examples
- Uses of groundwater (and other water)
- Country tables of water resource types and uses
- Discussion

Groundwater assessment (investigations & monitoring)

- Introduction to island groundwater investigations and monitoring
- Emphasis on what to do when going to an island (Makuluva)
- Simple (reconnaissance) methods
- More detailed methods
- Salinity measurement – what it means, table of values

Salinity testing

- Interactive session with participants tasting samples with different EC's and nominating preferred limit for drinking water (normal & emergency)
- Entry of values into spreadsheet
- Discussion of results

Afternoon

Preparation for 1st field trip to Makuluva

- Discussion
- Pose the problem: how to assess groundwater on Makuluva
- Equipment list – discussion of what to take (groundwater group only)
- Preparation of equipment (also later)

Exercise

- Prepare work plan
- Equipment list
- Prepare presentation to surface water group

Joint session with surface water group (at MRD)

Preparation of equipment

..... Section Break (Next Page).....

Monday 11th April (0830-start, 1700-finish)}}

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Joint session

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Tuesday 12th April (0800-start)}}

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*Field trip

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Wednesday 13th April (0830-start, 1700-finish)}}

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*Debrief and analysis of data from field visit

Discussion of previous day's findings and what is yet to come

Processing of manually obtained data into EXCEL

--> Preparation of map from GPS info -- outline, wells, sampling points

--> Pump test review

--> List and map of EC values

--> Data from Greenspan logger

--> Download telemetry data and process data (for groundwater group) *** check with PM

Discussion of results

*Afternoon

*Groundwater investigations & monitoring -- detail

Presentation

--> Planning & operating networks (type, locations, frequency)

--> Constraints (access, safety, budget)

--> Equipment - needs, operation & maintenance of equipment

--> Wellbore inventories, GIS and Databases

--> Examples of island monitoring programs

--> Successes, failures -- reasons

Presentation of various database outputs

--> Time-series data & profiles (Dbase, HYDSYS -- Tarawa)

--> Scatter plots -- spatial (e.g. DS -- NZ data, Cooks, AP -- Makires)

--> EXCEL spreadsheets (e.g. Cook Islands)

Exercises

--> Make up typical monitoring data recording sheet

--> Solomon Islands spatial info

--> Malakula data, if possible

Afternoon tea (1500 -- 1530)

Joint session with surface water group (st. MRD)

--> Sea level recording and use of data (TF)

Exercise

--> Try to download Surin sea level data from National Tidal Facility (Centre)

..... Page Break

programme

Programme

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Thursday 14th April (0800-start, 1630-finish)[]

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Friday 15th April (0830-start, 1700-finish)[]

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*Water quality assessment & monitoring[]

- >Introduction[]
- >Physical and chemical (basic)[]
- >Other specific chemical (e.g. metals, TTHM, BTEX)[]
- >Salinity monitoring - importance, methods[]
- >Biological[]
- >Special unusual (e.g. radiological)[]

*Water quality - practical []

- >Demonstration of available equipment (HDS and other bacteriological equipment and water chemistry equipment)[]

*Water quality - assignment -[]

- >Assignment related to lecture material and practical[]

*Afternoon[]

*Parallel sessions on Windows and EXCEL -[]

- >Split both surface water and groundwater groups into five sub-groups -[]
- >Windows session to be presented by surface water trainers and EXCEL by groundwater trainers -[]

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Groundwater

Mineral

Geological perspective

Exploration

Drilling

Exploitation

Fluid

Hydrological perspective

Monitoring

Renewable

Sustainable