17th Northern Research Basins
Workshop I Notes (*taken by Jane Assini*)
August 15, 2009
Recorded version of this meeting is available from Anna Abnizova

Introduction: Doug Kane

- Uniqueness of the NRB meeting
- Discuss the controversial issues
- New partnerships

Measurement of Solid Precipitation:
Doug Kane: we still struggle with this, snow at the end of the season, sublimation, and distributed snow in watershed

Rick Janowicz: GeoNor ppt gauges, peoples' oppinion on that with shields?

Oddbjorn Bruland: long experience with these Norwegian gauges (20 years), unable to keep up with demand. Reliable gauge.

Bent Hasholt: equation depends on windspeed. Which formula to fit to which instrument?

Jessica Cherry: GeoNor gauge in Barrow – shield presents a problem in Barrow, built up of PPT, GeoNor 30% less than airport snowboard, need correction equation to be included with the instrument

Doug Kane: no comparison has been done

Oddbjorn Bruland: use in remote climate, similar to Barrow, out of operation rarely, always has to be emptied, people to check on it once a month, run on solar power, works in winter. No orifice heater use. Cost

Jessica Cherry: starting a new project to validate or correct these measurements. Somebody wants to hang onto the project?

Rick Janowicz: modified double shield? Design, basis?

Jessica Cherry: design based on Russian design – double fence (not Wyoming), comes with a shield (small alter shield). Barrow part of network – designed for the lower 48, design is not ideal for Arctic conditions

Matthew Sturm: What's your shield? How does it do with stressful conditions? Wyoming does not perform well.

Stein Beldring, Bent Hasholt: Need to know height of orifice above snow field to calculate the wind speed needed for correction.

Stein Beldring: gauge fills up from bottom, big advantage to have a windspeed sensor. Really heavy snowfall (50 cm/day) has problems with heavy catch on top of sensor, type of snowfall; demand of two sensors by Americans, now up to 3 sensors.

Wolf-Dietrich Marchand: explanation required

Stein Beldring: works with bucket suspended with string, oscillations have frequency depending on weight. In order to avoid problems, stop measurements when snow started to over fill – impractical without constant checking.

Bent Hasholt: drifting snow problem, overcatch - some type of correction (complicated)?

Discussion: Other methods? Why not discuss other methods to avoid these problems. Electric properties of snow, snow pillows, radiation

Discussion: Hydro Quebec wanted to install network – developed a gauge with Campbell Sci. to measure SWE.

Wolf-Dietrich Marchand: Constructional bucket, or shield of some kind of wind field will have problems, so is there a better way?

Matthew Sturm: Sveta shows a new method: solid state SWE sensor. Not a snow pillow. Set of stress sensors. 3x3 m plates – not designed for wind, however, are performing well. NOT a ppt measurement, it's for snow on ground. Very large flat area, transport in = transport out. No moving parts, robust (more information available)

Doug Kane: good thing about pillow gives you end of winter snow cover. Another device, hot plates (power demand?) installed at Toolik with GeoNor – still waiting on results

Jessica Cherry: default algorithm not well tuned for Arctic conditions – could be corrected for a number of Arctic conditions, start to tease apart spatial variability from under/over catch – inter-variability approach

Stein Beldring: test of new sensor with old is very important, Swiss had projects with snow cable (inexpensive) World Consumer in Norway

Doug Kane: Any other questions?

Glen Liston: modeller solution – significant difficulties – we can measure snow on ground. Measure that and work backwards to determine precipitation required to get that accumulation

Rick Janowicz: snow pillow, Nipher, GeoNor – provide a nice comparison

Jessica Cherry: not easy to measure snow on the ground. Ultrasonic sensors are hard to calibrate – algorithms

Glen Liston: account snow transport in and out, sublimation, then look at the precipitation needed to create these conditions

Stein Beldrig: statistics? Everyone is concerned with uncertainty, better results when you combine them all

Doug Kane: good discussion. Lets move on

Doug Kane: any other issues? Data Networks? Distributed hydro model with no distributed data? Less and less data out there every year.

Discussion: can radar help us? RADAR Solid ppt does not have impressive accuracy, does provide more than point measurements. Ability to use weather RADAR – network to help with radar – not more than 60 m radius. Problems with slopes. Combine maps from RADAR and point measurements. Take into account distance to the RADAR.

Doug Kane: anything else?

Arni Snorrason: improve the observation systems in part of the project. Helpful to get a statement from a meeting like this that addresses the gaps and concerns with the problem

Stein Beldring: we have met models, lots of data, coarse data can produce better than observations??

Arne Snorrason: model gives very good results with respect to hydrology

Chris Spence: without the data, how do you know?

Arni Snorasson: runoff is hard to estimate in High Arctic, not so in Iceland. We have very good measurements of runoff

Wolf-Dietrich Marchand: some stations up in the north were removed- WHY?

Kathy Young: it was simple, no MONEY, government cutbacks. They did put some AWS in place – half of the time they are destroyed by polar bears. Scott has access to that climate information?

Scott Lamoureux: unreliable for many reasons, set up after a gap, site changes, further pressure on the network in Northern Canada

Jessica Cherry: not practical for vast areas (weather radar) like Alaska, Canada. Slow the loss of ground stations. Work with remote sensing – better sensors, work with space agencies to develope data

Ray Bradley: every single official met station in Canada is within 100 m of sea, or on the coast. Missing upland and inland data

Matthew Sturm: loss of man stations – tempted into remote sensing and AWS – they can't solve the problems. NRB needs to set a statement to say: we need these things to work toward a better solution. We can't fool ourselves into thinking remote sensors are a replacement at the time.

Doug Kane: higher elevations = most runoff. PPT, steep slopes. The biggest disappointment is the disconnect which satellites promise and the fact that we still need ground based measurements

Hok Woo: negative things: If you happen to use Canadian data now, be careful. Snow on the ground, same number for 3 months? Eureka, big pillows, zero windspeed for winter? Resolute, contract to private company to do snowdepth measurements – no interest in the data they are collecting. All of Canadian (Queen Elizabeth Is.) 3 stations for the area of France! Maintain more stations and radar. We have to make sure we safeguard the ones we have for sure. Great data for indicator of modelling, a black box will work. Get together with everyone to protect this stuff.

Chris Spence: a statement for preserving networks is a good thing. Walking away from funding – no data?? What's the risk of not collecting any data?

Discussion: WMO meetings, which all the Federal Agencies plug into. Protocols for measurements are decided at these meetings. Filters down to the National Agencies. 20 years ago – exactly the same discussions as today. Another WMO meeting about in/upland. Resolution, but no money to maintain this level of measurements. Expensive! Fundamentally a question of money.

Arni Snorrason: point to the importance of integration of the networks. From the integration there could be money saved. Integration of modelling networks. How to optimize these networks for our purposes?

Doug Kane: anything else?

Stein Beldring: femonstration of point measurement vs. Radar. Tested for information purposes. Combine information. Use elevation gradients in Norway to downscale – better value than we have today

Hok Woo: echo of the radar with respect to elevation?

Stein Belring: problems with radar. High topography regions is where you need the radar the most.

Wolf-Dietrich Marchand: high based radar, looks above topography.

Stein Beldring: try to build up PPT of constant elevation up.

Doug Kane: Thank you.