


Towards a 'worker/citizen science' model: a qualitative investigation of workplace heat stress and climate change



James Goodman, Leena Thomas, Francesca da Rimini & Elizabeth Humphrys

Climate Justice Research Centre

Faculty of Arts and Social Sciences,

University of Technology Sydney



Climate-work Nexus

- 2014: IPCC's 4th Assessment Report - 'heat strain and heat stroke' under climate change a major issue with more than half of all non-household labour outdoors
- 2015: WHO's 'Atlas of health and climate', cited heat stress as an 'emerging' challenge
- 2015: ILO's 'Guidelines for a Just Transition' called for 'assessments of increased or new OSH risks resulting from climate change'
- 2016 UNDP's 'Climate Change and Labour: Impacts of Heat in the Workplace', stressed threats to livelihood and health, stating research is 'urgently required'

Work and Climate Agency

- Rift between 'work' and 'environment': climate as secondary, an abstraction, removed from the workplace
- Climate heat is experienced as a 'Occupational Health and safety' issue, directly re-shaping work
- Climate heat becomes an organising tool to strengthen collective power over the conditions of work
- A way of politicising climate impacts, bringing labour organisations more directly into the climate policy debate

Research questions

- (i) What is the direct experience of workplace heat in the context of climate change?
- (ii) How can citizens document, publicise and deploy ground-level experiences in workplace heat?
- (iii) What collective responses can be developed by people who are affected by workplace heat, in planning and policy?
- (iv) How can the direct experience of workplace heat gain traction in climate policy debates?

Objectives

- Engage with working communities, across North and South, to gather data about their own experiences
- Create tools to collectivise data, to have a direct 'social impact' on practice and policy
- To build a self-populated 'crowd-science' data platform, a model that can self-replicate
- To build a body of scientific knowledge that strengthens collective agency under climate heat

Method

- Map human stories into the climate-heat data.
 - ‘stories as companion to quantitative assessments’ (Moethi et al 2017)
- Spatialised abstract climate heat data to be populated with experiential ethnographic accounts, across
 - industrial sectors (eg, construction, agribusiness, recycling)
 - locales (urban, rural)
 - national/regional contexts
- Develop an online living archive.
 - editable big data visualisation, webisodes, methodology toolkit, etc

Method...

- 'Performative' data
- 'For citizens, bodies...read through numbered data points turned into vehicles of political contestation.' (Renfrew 2017)
- Local actors as 'co-creators of scientific knowledge'; 'valorizing lay expertise and experiential knowledge'. (Renfrew 2017)
- Flexible model of 'worker-citizen science' - replicate or adapt in response to localised socio-cultural, political, economic factors

Current Confirmed Partnerships

- Australia: Institute of Sustainable Futures, UTS; Australian Council of Trade Unions; Construction Forestry Mining and Energy Union (CFMEU, Construction Division); National Union of Workers (NUW); Centre for Pattern Recognition and Data Analytics (PRaDA), Deakin University
- India: School of Media and Cultural Studies, and School of Disaster Studies, Tata Institute of Social Sciences (TISS), Mumbai
- New Zealand: Ruby Coast Research Centre
- International: International Trade Union Confederation (ITUC)

Data collection

- Heat Stress Sensors/Data Loggers
- Self-recorded accounts via web/phone app
- Recorded and filmed interviews

TEMPERATURE

i. Please tick the scale below at the place that best represents how you feel about the thermal environment right now.

You may tick in an appropriate place between two categories, if you wish



ii. Is the thermal environment acceptable to you right now?

1 Unacceptable 2 Acceptable

iii. Please select the box below that best represents how you feel right now?

I would like:

1 to be warmer 2 no change 3 to be cooler



Data Analysis

- Quantitative: monitored heat data
- Qualitative: textual analysis of surveys, recorded accounts & interviews

Senonics

Data Logger Report

Setup

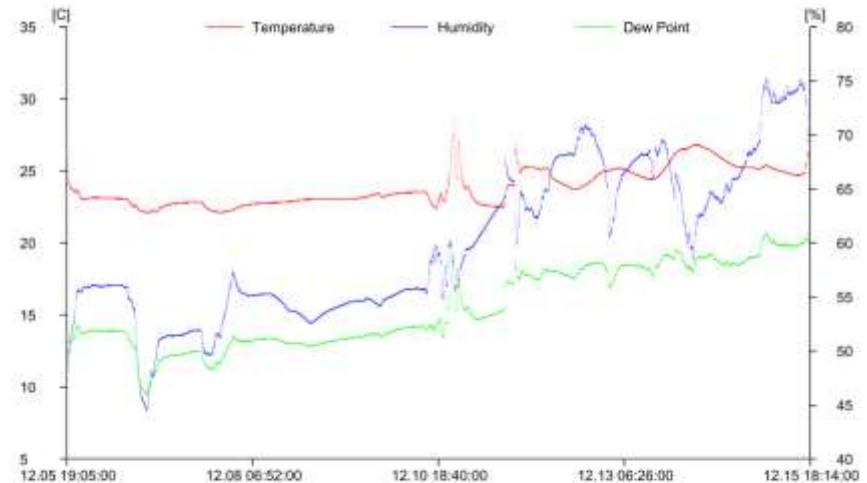
Logger: Senonics Mlnow 1.0TH -
Logger Start: Button Press
Logger Interval: 1 min

Alarms

Temperature Logging:	Enabled	Humidity Logging:	Enabled
Temperature Alarm (High):	nan	Humidity Alarm (High):	nan
Temperature Alarm (Low):	nan	Humidity Alarm (Low):	nan

Statistics

Temperature Maximum:	28.78 C	Humidity Maximum:	75.27 %	Dew Point Maximum:	21.3 C
Temperature Minimum:	22.12 C	Humidity Minimum:	44.51 %	Dew Point Minimum:	8.47 C
Temperature Average:	23.91 C	Humidity Average:	59.88 %	Dew Point Average:	15.56 C
Temperature Samples:	14350	Humidity Samples:	14350	Dew Point Samples:	14350

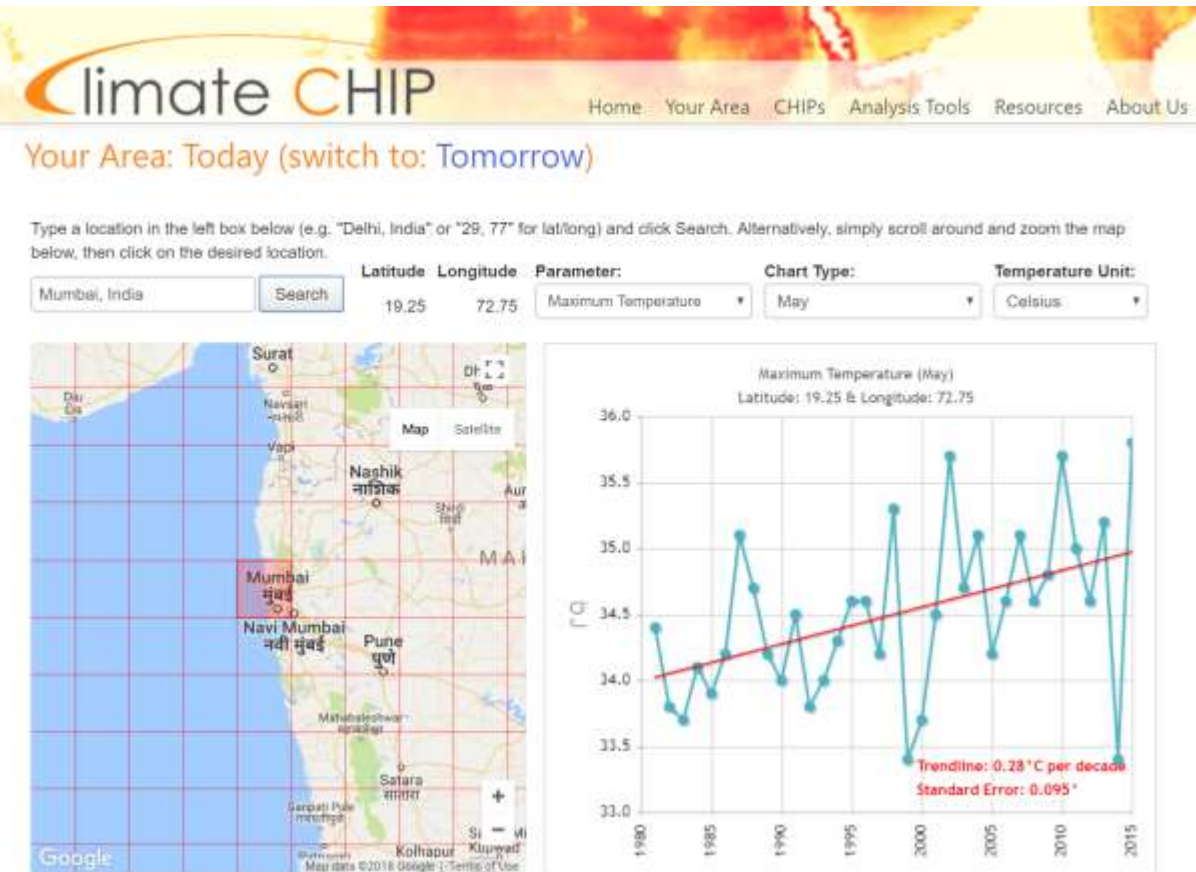
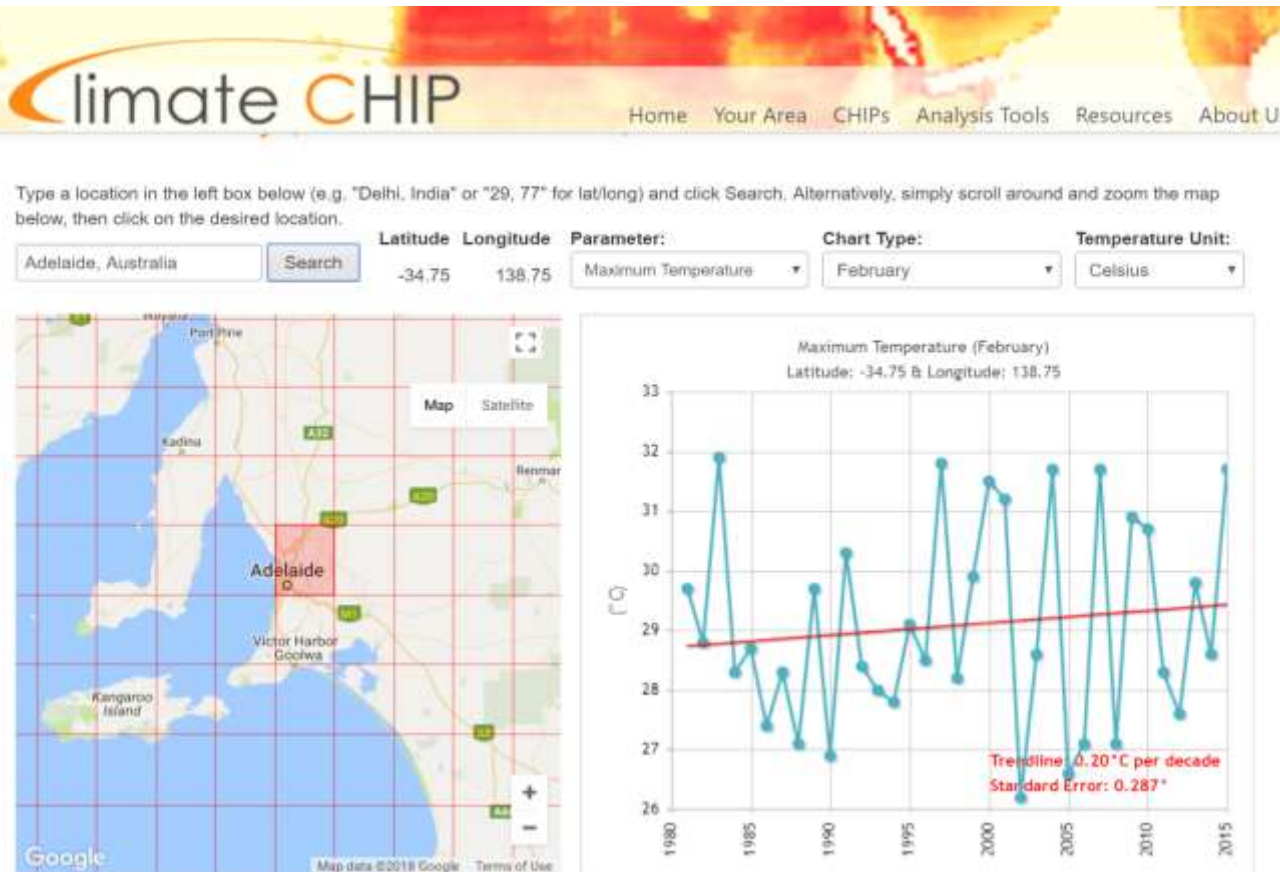


Pass/Fail

PASS. Logger within temperature and humidity limits.

Notes

Big Data Mapping



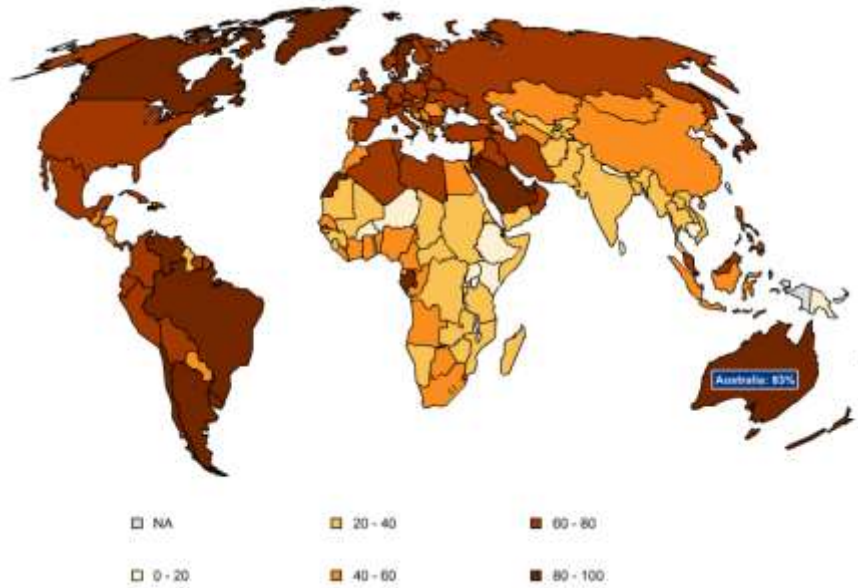
Partners

- Ruby Coast Research Centre, NZProf Tord Kjellstrom, Prof Bruno Lemke
- Centre for Pattern Recognition and Data Analytics (PRaDA) – Deakin Prof Svetha Venkatesh

Case studies: North-South citizen science

- Project be piloted across North-South divides, initially focusing on informal workers in India (Mumbai) and with unionised workers in Australia (Sydney)
- North/South divide in knowledge production, inc. climate change research – can hinder global agreements & national actions – practical steps include encouraging citizen science (Blicharska et al 2017)
- ‘Whose knowledge counts?’ (Bonney et al 2016). Incorporate ‘grassroots and lay forms of knowledge into scientific protocols and analyses’ (Renfrew 2017)

A focus on urban contexts



<http://www.globalhealthfacts.org>

Over 50% of us globally live in cities

Cities occupy 2% of global land but use 75% of resources and generate 75% of global wastes

Urban heat island
Heat stress
Pollution

Cities as key sites of agency and social innovation to address climate change

The case of Mumbai, India

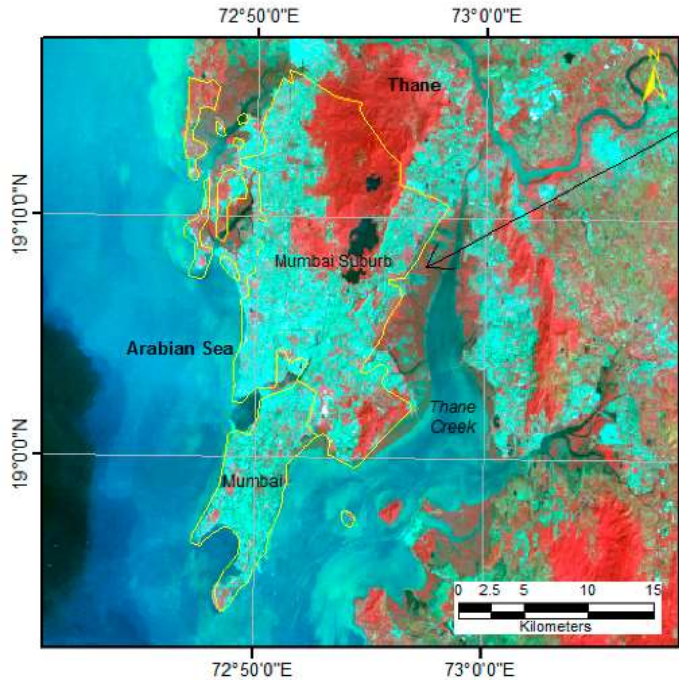
Focus on Mumbai's informal workforce



A collaboration with researchers at the Tata Institute of Social Science
Plus public health and occupational health organisations
and community researchers

Emphasizing experience, advocacy and social agency

Enriching quantitative data with qualitative feedback and narratives



Grover, A. and Singh R. B
Environments 2015, 2(2), 125-138;

Recognizing the value of humanising urban heat as a lived experience

Enriching quantitative data with qualitative feedback and narratives



Temperature
26 °C

Relative Humidity
37%

Air Speed
0.01m/s

Globe Temperature
26 °C



Recognizing that people's expectations vary in sympathy with everyday climate and culture

Anticipated Impact - pathways

- Linkages and initiatives on the ground in Mumbai
- New skills, capacity and commitments to advocacy on climate change
- Strategies to link experiential narratives and policy in local governance
- Narratives integrated with 'big data' climate science to enable more effective climate policy.
- A one-hour ethnographic film; media and policy reports, and academic outcomes
- A bilingual 'Hot Work' website: a platform to be replicated in other urban contexts towards citizen led climate governance.

Unionised labour in NSW



Scoping conversations with trade union representatives in heat exposed workplaces

Initial themes – heat and unionism

- Construction union reports that more members contact the union for help on hot days than at any other time.
- Unions matter: there is a sharp contrast between legislated protections and practices in exposed workplaces that are union-organised, and those not.
- Livelihood is central: waged workers are pressured by employers to maintain productivity; contractors and pieceworkers work longer hours.
- Heat can be mobilised collectively: asserting employer responsibility for heat stress can produce material benefits for workers, and help unionise

Unionists quoted

- *'On these kind of questions we've kind of humanised management'.*
- *'The more organised a workplace is, and the more workers have agency, the better the employer is at dealing with the heat stress*
- *Getting the heads up on all the issues as they happen would hugely useful and then be able to look at patterns from that, that would be massive'*
- *'We are always looking for ways to make the climate issue bread and butter. And this is a good way of doing that.'*

Next Steps...

- Establish the tools, protocols and interface, and trial the method for exposed workers at in Mumbai and Sydney
- Develop ways to deploy aggregated experiential data in multiple policy fields
- Demonstrate the approach through international comparison
- Launch data collection and linked organising model for labour organisations to replicate and populate the platform

- ▶ Thank you

Climate Justice Research Centre, University of Technology Sydney:

- <https://www.uts.edu.au/research-and-teaching/our-research/climate-justice-research-centre>

Contact: james.goodman@uts.edu.au



Tata Institute of Social Sciences, Mumbai



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