

UNEP CIS-Pac5

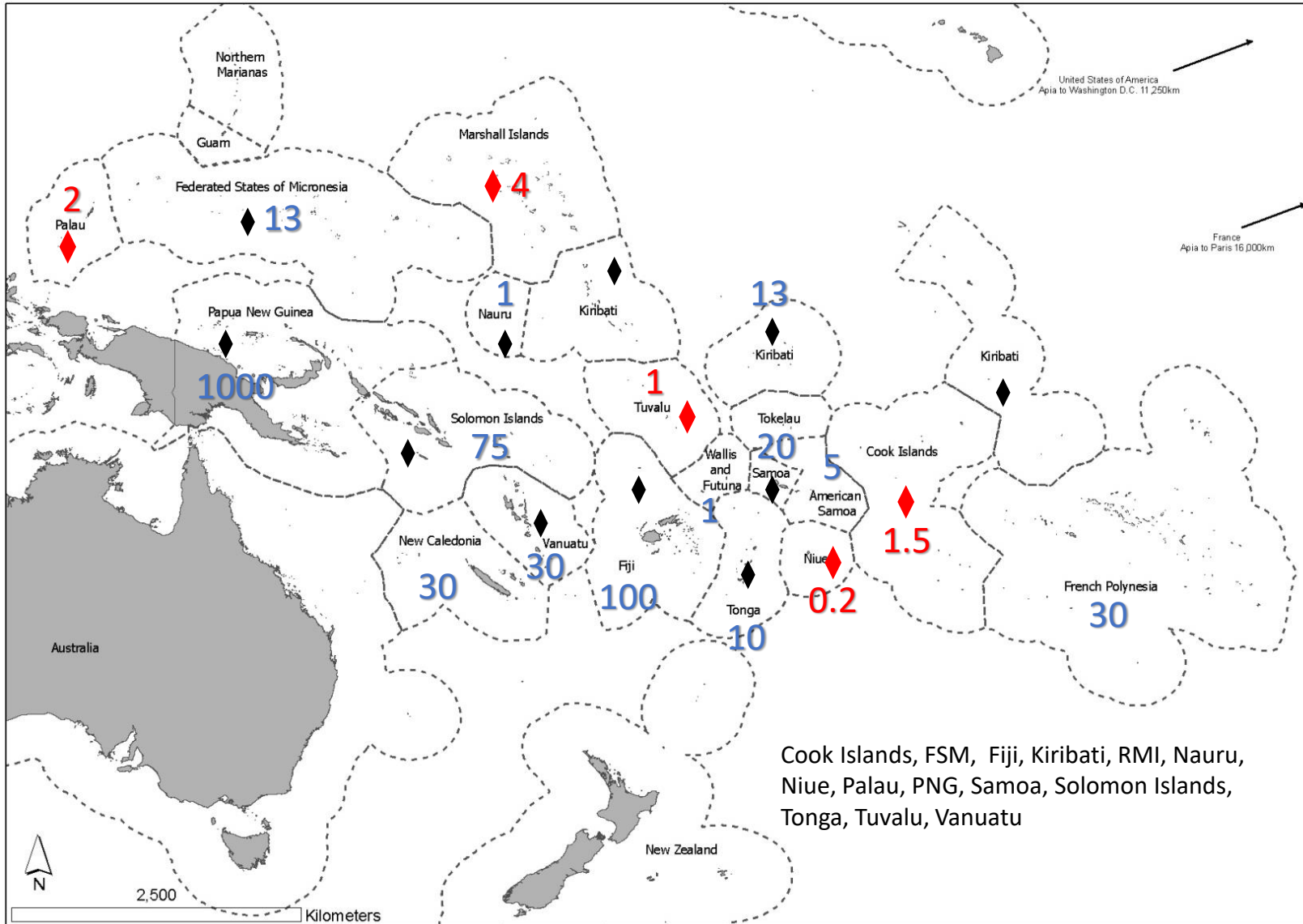
Enhancing Climate information and knowledge services for
resilience in 5 island countries of the Pacific Ocean

유진호 (APCC)

사업개요

- 기간 (2021.9-2027.9, 5+1년)
- 사업비 : ~5000만\$ (APCC : 164만\$, 3.3%)
- 대상국가 : 태평양 5개국 (쿡, 니우에, 팔라우, 마셜, 투발루)
- 참여기관 (RTP) : UNEP, APCC, BoM, ESNZ, SPREP, SPC, UH, RCCC
- 전체 사업 내용
 - 국가 기후서비스 강화를 위한
 - 1. 체계(제도), 2. 시스템(관측, 예측), 3. 소통, 전파, 4. 협력 강화
- APCC 사업내용
 - 2. 예측 시스템 및 역량 강화
 - PICASO 개선 및 impact based forecasting 지원
 - Capacity building (10 Trainings and 4 YSSPs)
 - 3. 조기경보 소통 체계 구축 (outsourced to Ewha Womens Univ.)
 - 위성자료 기반 early warning mobile communication system

태평양 도서국 특성



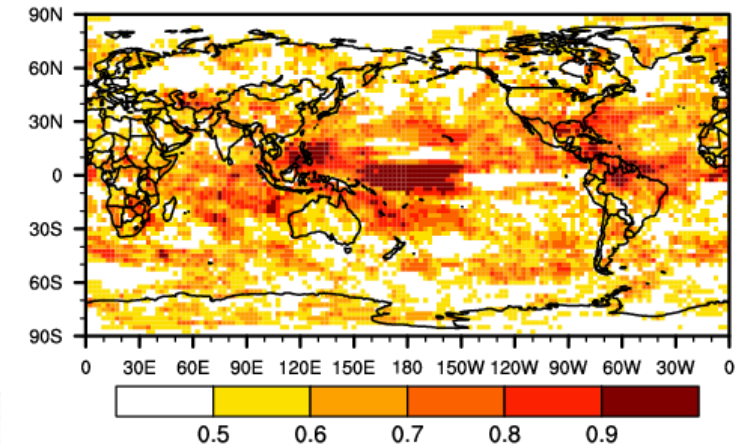
Cook Islands, FSM, Fiji, Kiribati, RMI, Nauru, Niue, Palau, PNG, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu

넓은 영역에 소수의 사람들이 거주

- 다수의 사회경제활동이 주변 선진국 (호주, 뉴질랜드) 및 국제 원조에 의해 유지 + 어업 (license)
- 지역 네트워크, 기구를 통한 협력이 활발

5개 대상국은 그 중에서 가장 작은 국가들

계절 예측 성능은 가장 높은 지역!



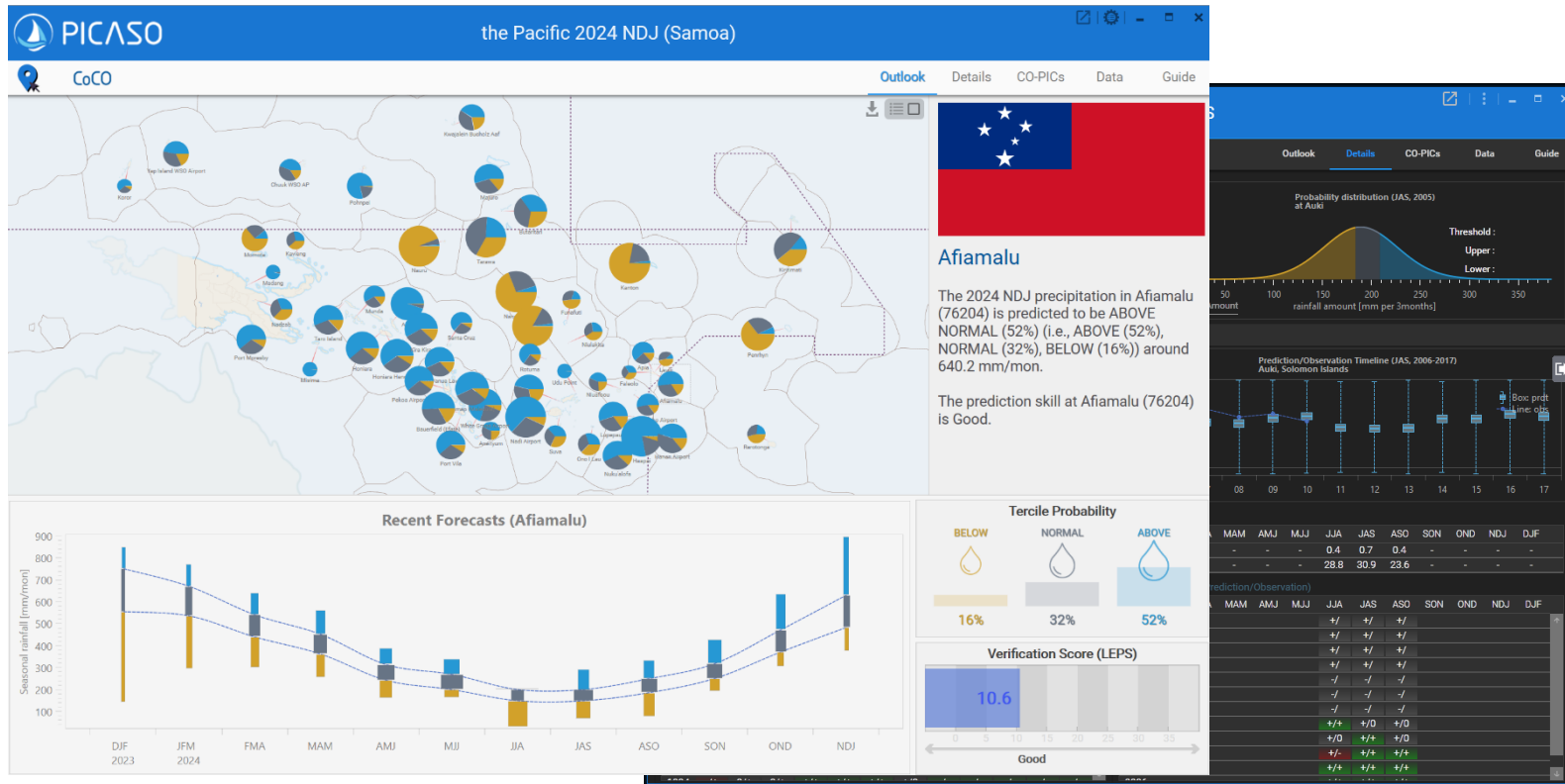
5개 도서국



Deliverables

- PICASO 개선 (v2.5)
 - 변수 확대 : seasonal rainfall → Monthly rainfall & temperature
 - 5 countries 10 stations (12 seasons → 36 months x 2 variables)
 - Sector tailored forecast information
 - Improvement of UI and operating system
- 역량 배양
 - 5 regional trainings(연 1회), 5 country trainings ('27)
 - 5 YSSP(방문연수) - 국가별 1인, 1개월
- 조기경보
 - Working mobile app. providing early warning information on several hazards derived from Satellite image (Chollan-A2)

PICASO (Pacific Island Countries Advanced Seasonal Outlook)



PMC hears breakthrough in climate prediction modelling

Details Published on 17 August 2017

Like 34 Share Tweet G+ in Share

By Samisoni Pareti of Islands Business Magazine & Bentaake Kiima of Broadcasting & Publications Authority (Kiribati)

16 August, 2017, Honiara, Solomon Islands, PMC-4 – A joint South Korean and Pacific Island project has announced the development of an advanced climate prediction system that climatologists predict would revolutionise seasonal climate forecast in our part of the world.

Seasonal climate prediction tools for Pacific Island Countries

Pacific Island Countries (PICs) have access to several operational seasonal climate prediction systems. These differ considerably in their forecasting methodologies, spatial resolution, target users, and integration into National Meteorological and Hydrological Services (NMHSs).

The principal tools include **SCOPIC**, **PICASO**, **CLIK-P**, **ACCESS-S**, and **regional multi-model forecast products**. There are also regional outlook services provided by NIWA, NOAA, and the Pacific Regional Climate Centre Network (RCC-N).

An important distinction is between tools that allow NMHS forecasters to *generate their own national seasonal outlooks* and services that provide *ready-made regional forecasts*.

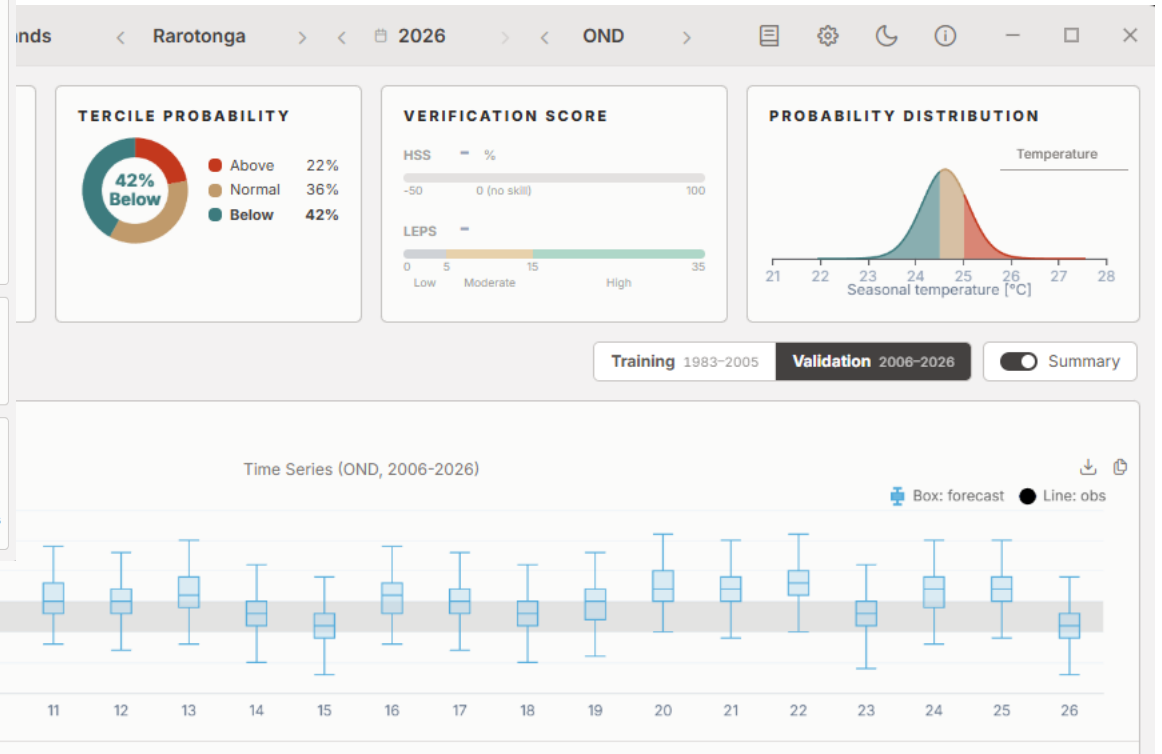
1. Main seasonal prediction tools

Tool	Organization	Forecast approach	Main purpose
SCOPIC	Australian Bureau of Meteorology / Pacific partners	Statistical prediction using historical relationships	Generate station-based seasonal climate outlooks
PICASO	APCC / SPREP	Hybrid statistical-dynamical prediction using APCC MME predictors	Produce locally tailored station-based seasonal forecasts
CLIK-P	APCC / Pacific partners	Dynamical multi-model ensemble with configurable forecast combinations	Generate and evaluate customized seasonal forecasts
ACCESS-S	Australian Bureau of Meteorology	Coupled dynamical climate prediction	Provide regional gridded seasonal predictions
APCC MME	APEC Climate Center	Dynamical multi-model ensemble	Provide probabilistic global forecasts and climate-driver predictions
PEAC seasonal outlook	NOAA and partners	Expert-consensus outlook drawing on multiple prediction systems	Support U.S.-Affiliated Pacific Islands
Island Climate Update (ICU)	NIWA / Earth Sciences New Zealand	Regional synthesis of dynamical guidance and climat ↓ ignostics	Provide monthly South Pacific climate outlooks

주요 실적 및 성과 : 기후예측

• 기후예측 개선

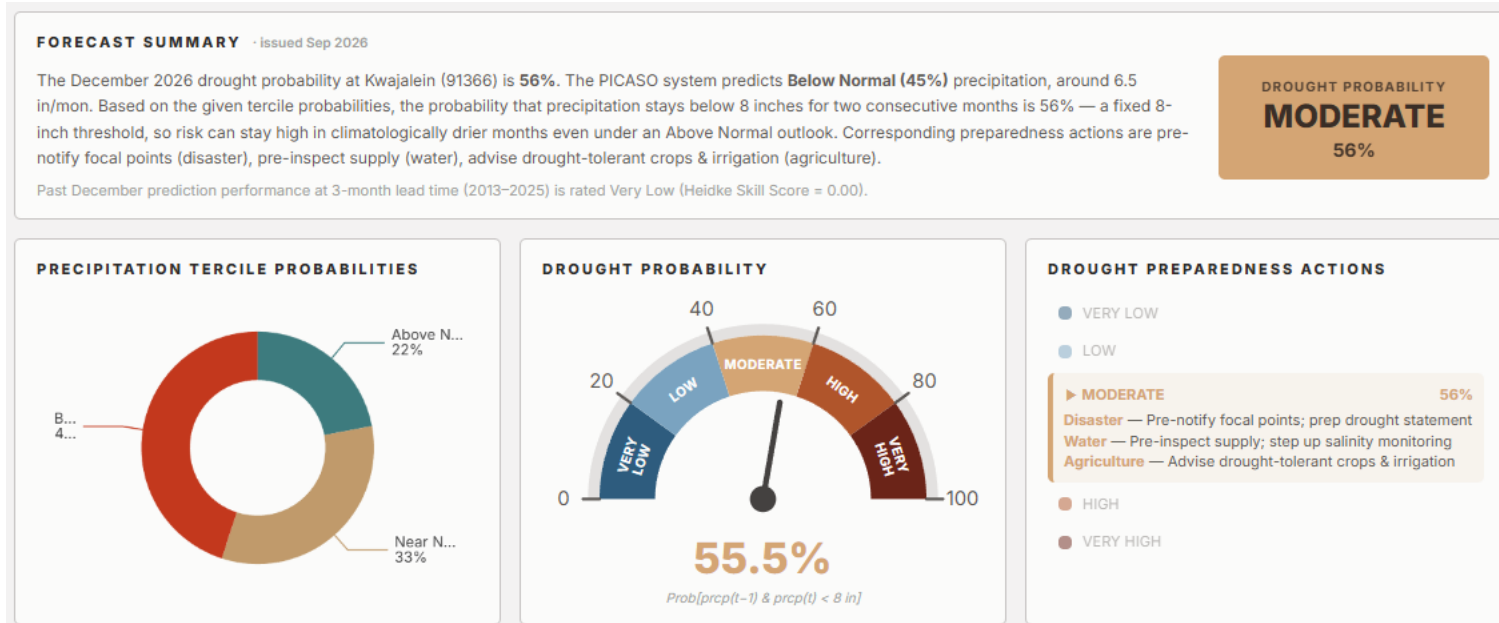
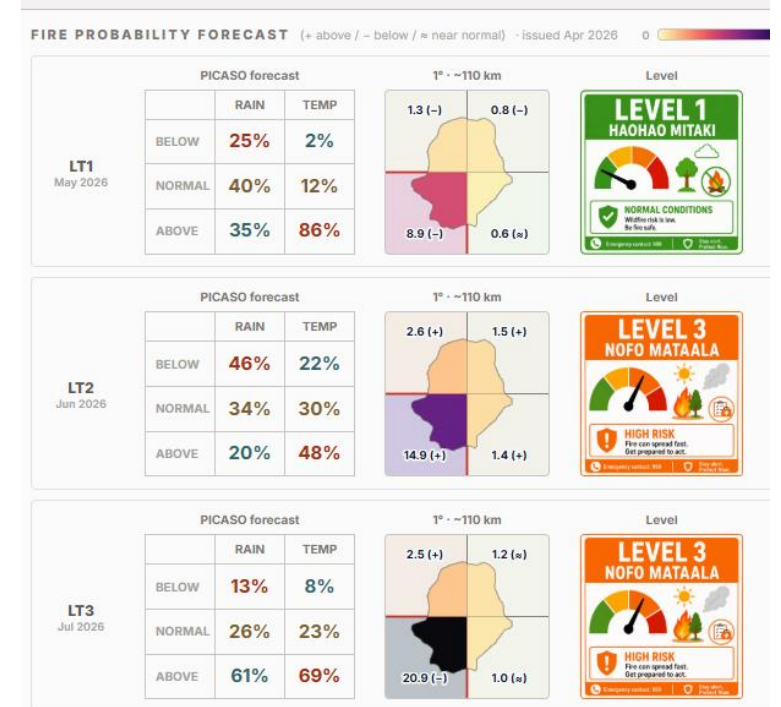
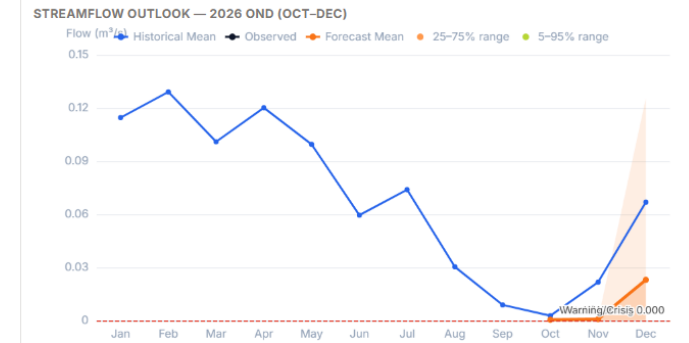
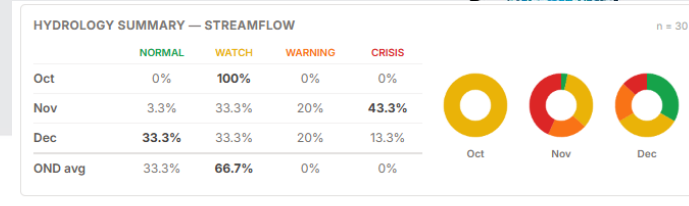
예측대상 확대 : 120개 → 960개
UI 개선 및 Multi-platform 지원
운영 효율화



주요 실적 및 성과 : 기후예측응용

• 응용예측

- ✓ 마셜제도/투발루: 강수예측 → **가뭄**조기경보
- ✓ 쿡제도/팔라우: 기온/강수예측 → **수문**예측(수위, 유량)
- ✓ 니우에: 기온/강수예측 → **산불**위험 예측



주요 실적 및 성과

- **National consultation for 응용예측** : 국가별 context 이해가 필요. 어디에, 무엇을 응용할 것인가?
- **Stakeholder consultation meetings**
기상청, 재난관리, 농업, 수자원, 수산업, 보건, 환경, 관광, 소방, 적십자회 및 지역 community 등 국가별 10회 가량
- ✓ 사용자 별 요구 : '기후' 의 영향 파악 → 영향에 관한 의사결정 review → 정보의 필요성 논의/도출



- **고려사항**
 - ✓ 현재 각국 기상청 기후정보의 전달, 활용 현황
 - ✓ 가용 sectoral data, magic number(climate indicator) 존재 유무
 - ✓ 제도, 국가규정 등 (실질적 Impact)
 - ✓ PICASO output(월평균) 한계

주요 실적 및 성과 : 역량배양

어떤 역량을 배양할 것인가?

- 기술, 정보의 외부 의존도 큼
 - 자국 관측자료 → 해외 DB → 온라인 접속 및 다운로드
 - 자체 생산 기후예측 정보 부재
- **YSSP(장기초청연수)** : 자국민에게 전달하는 정보는 스스로 만들 수 있게 하자
 - Data analysis (python)
 - Basic climate dynamics
 - Stepwise course (basic → advanced)
 - 신기술 도입의 장애물 제거
- **Regional Training** : PICASO 활용 학습 및 기후예측 기술 이해도 향상



주요 실적 및 성과 : 역량배양

Hi there Jin Ho

Thank you for the report regarding Metua Ngaoire CIMS Participant.

It is a pleasure to read the positive outcome and participation of the candidate to the training.

The CIMS has now 2 x participant that has attended the Basic YSSP Training and looking forward to the advanced level.

Mr Akaara was one of the participant and actually showed me what he had learned using a software called PYTHON on the training.

We used rainfall data to produce graphical output which I was impressed. Am sourcing a computer so he can continue those skills.

Once again much appreciate the report.

Regards



Maara Vaiimene | Director

Cook Islands Meteorological Service

Talofa Dr Han,

Thank you very much for the code, it runs perfectly. This information is very helpful for the Agromet Bulletin because Agriculture department needs to know average monthly rainfall so they can know which crops is applicable for planting.

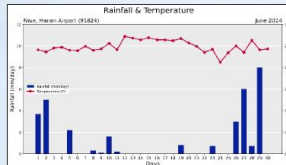
Regards

작지만 의미있는 변화!

CLIMATE SUMMARY FOR JUNE

The total monthly rainfall for June amounted to 32.3mm, making it the third lowest rainfall since 2012, with a cumulative total of 13.4mm. The highest daily rainfall occurred on the 29th June with a total of 8.0mm. This was attributed to a weak trough of low pressure, accompanied by cloud cover and showers that affected the island.

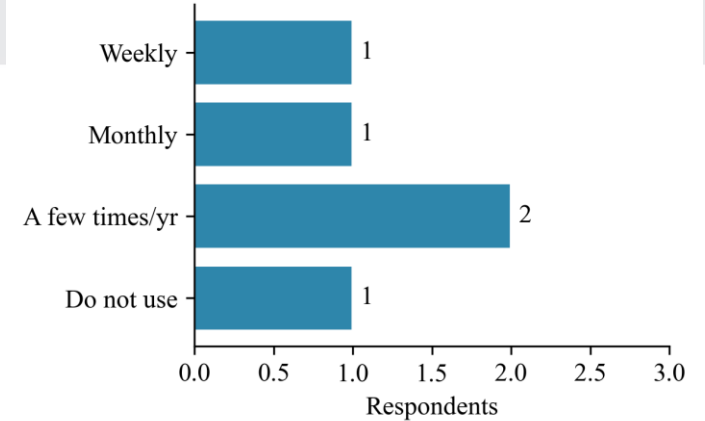
The graph shows, the temperature reached its peak on June 12th, reaching 27.2 Degrees Celsius. This rise in temperature was influenced by moderate to fresh easterly winds that affected the island. However, on June 24th, the average temperature dropped to 21.2 Degrees Celsius due to a moist east to southeasterly wind flow resulting in fresh to strong winds. Throughout the month of June, the temperature fluctuated between 21.2°C and 29.1°C.



CLIMATE PARAMETERS FOR JUNE

Rainfall Total (millimetres)	32.3
Number of Rain Days	19
Average Temperature	24.8 °C
Maximum Temperature	30.0 °C
Minimum Temperature	15.1 °C
Average Relative Humidity	77%
Total Sunshine Hours	171.7

(a) Python usage frequency



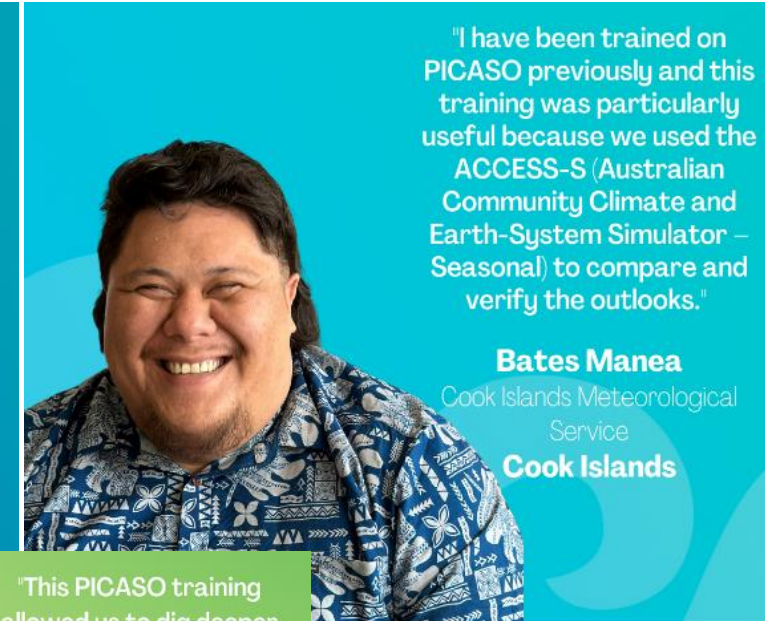
주요 실적 및 성과 : 역량배양

- Regional Trainings



"The breakout groups and activities enabled us to use country-specific data and that made the training relevant. My recommendation for future training would be to integrate more models to compare with."

Samson Kaneko
National Weather Service,
Majuro
Republic of the
Marshall Islands



"I have been trained on PICASO previously and this training was particularly useful because we used the ACCESS-S (Australian Community Climate and Earth-System Simulator – Seasonal) to compare and verify the outlooks."

Bates Manea
Cook Islands Meteorological
Service
Cook Islands



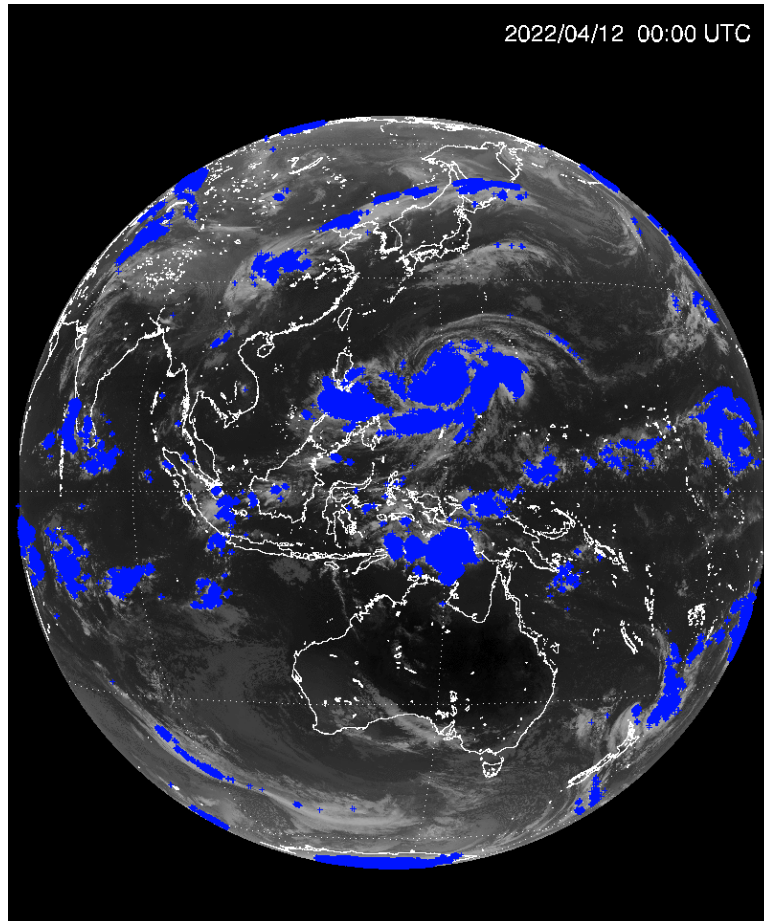
"This PICASO training allowed us to dig deeper into the Multi-Model Ensemble (MME) side of forecasting and I learnt how to integrate and use another predictor in the programme."

Kiku Mochimaru
Palau Meteorological
Services
Palau

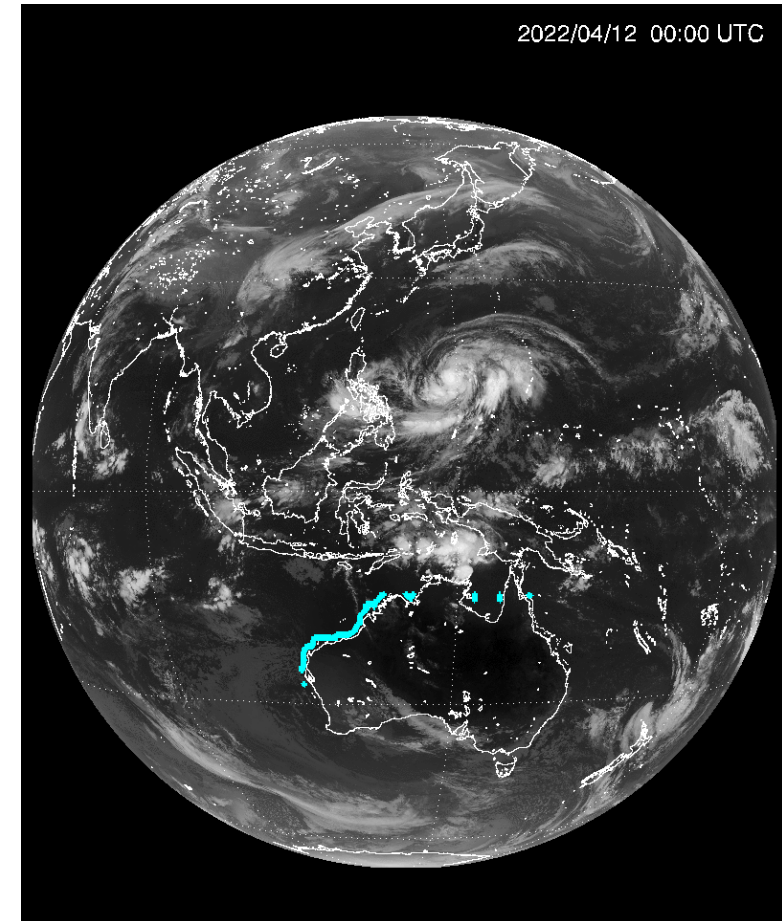


주요 실적 및 성과 : 조기경보앱

Rainfall



Wind-wave



주요 실적 및 성과 : 조기경보앱

22:00

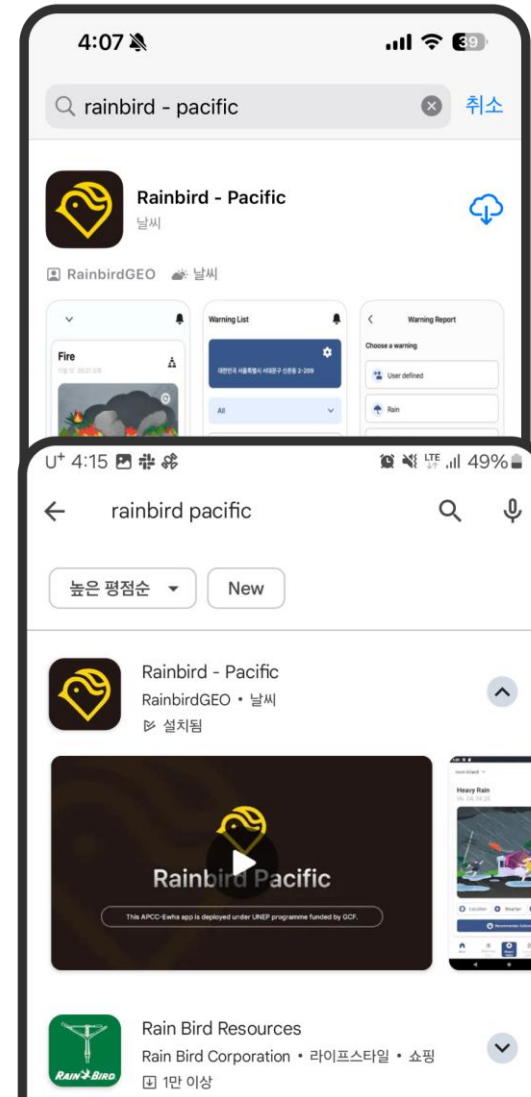
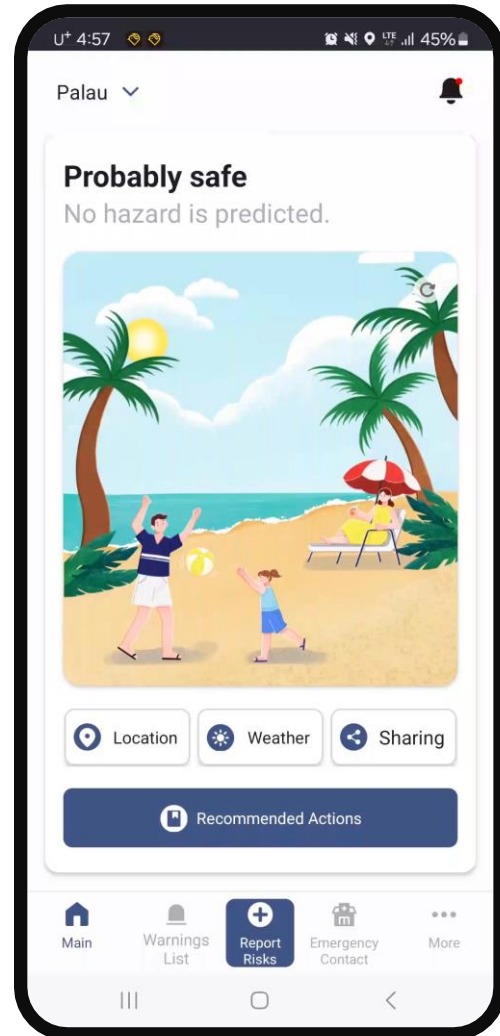


Rainbird Pacific

This APCC-Ewha app is deployed under UNEP programme funded by GCF.



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천리안 위성기반 재해위험
조기경보앱

- 집중호우 등 위험기상현상의 1-2시간 선행경보 제공
- Prototype 조기배포 후
 - 정확도 점검 및 보완
 - 현지 기관 (기상청, NDMO)과의 협의를 통해 기능 재구성
 - (국가 공식 경보와 위성진단 경보의 구별, 사용자 report 제한기능 등)

지역내 협업 및 조율 (where do we stand?)

- RTP coordination meeting : 매 1-2개월마다 1회 (online)
 - 정보 공유 및 협업, joint mission 수행
- Project Steering Committee (PSC)
- Pacific Meteorological Council 및 관련 지역 메커니즘 참여
 - PICS panel & P-RCC_N meeting
- 과학기술 역량 배양 수요가 매우 큼
- Wider consensus on coordination of efforts/products
 - 국가별 입장 차이 : Aus/NZ, US, PICs + UK
 - P-RCCN might be an important vehicle
- Expanding collaboration opportunities : USGS, CSIRO, ESNZ



- UNEP CISPac-5 사업은 APCC의 기후예측 정보 생산 및 활용 기술을 바탕으로,
- 태평양 5개 도서국 기상청의 기후예측서비스 역량강화를 위해,
 - 기후민감 분야 기후응용예측정보 생산을 포함한 기후예측도구 개선
 - 기상청 직원들의 기술역량 배양
 - 조기경보 앱 개발 및 배포 수행
- 성과의 지속성 및 지역내 주류화를 위해,
 - 국가별 교육 및 Launching event 개최 등 후속조치 수행
 - 지속적인 교류와 협업 메커니즘 (PRCC 등) 활용
 - 후속 사업 연계 (ROK-PI CLIPS 3: 2025-2028) 예정