Hybrid5.0.13 DCD4.1 Testing

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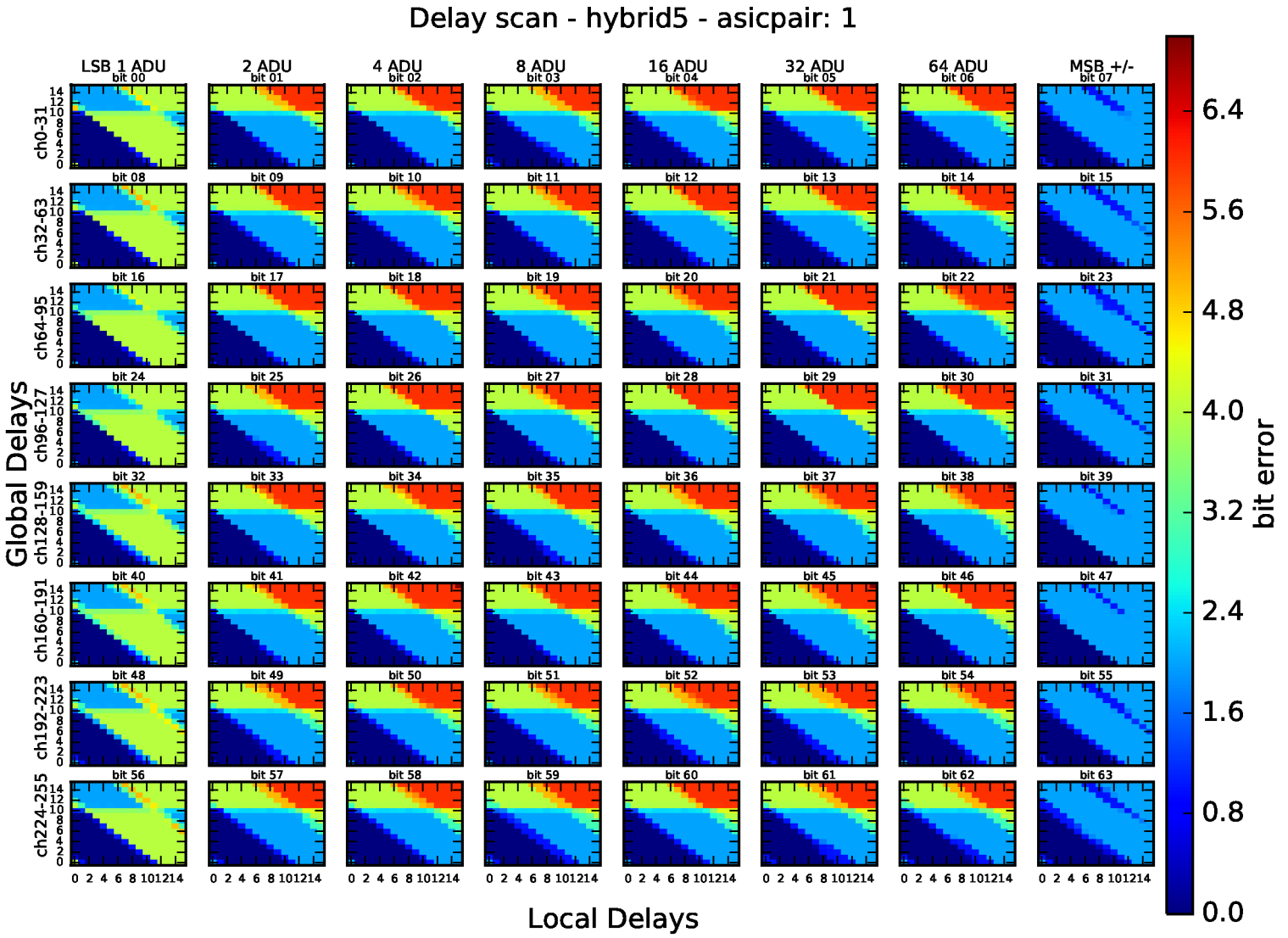
H5.0.13 DCD4.1
DCD-DHP Communication



delays can be optimized

H5.0.13 DCD4.1 ADC Optimization

- module H5.0.13 with DCD4.1 has been optimized in Bonn
- redo optimization with Goettingen setup, check if same optimal parameters are found
- on H5.0.24 with DCD4.1 we saw different optimal working points for Bonn and Goettingen setup

H5.0.13 DCD4.1 ADC Optimization

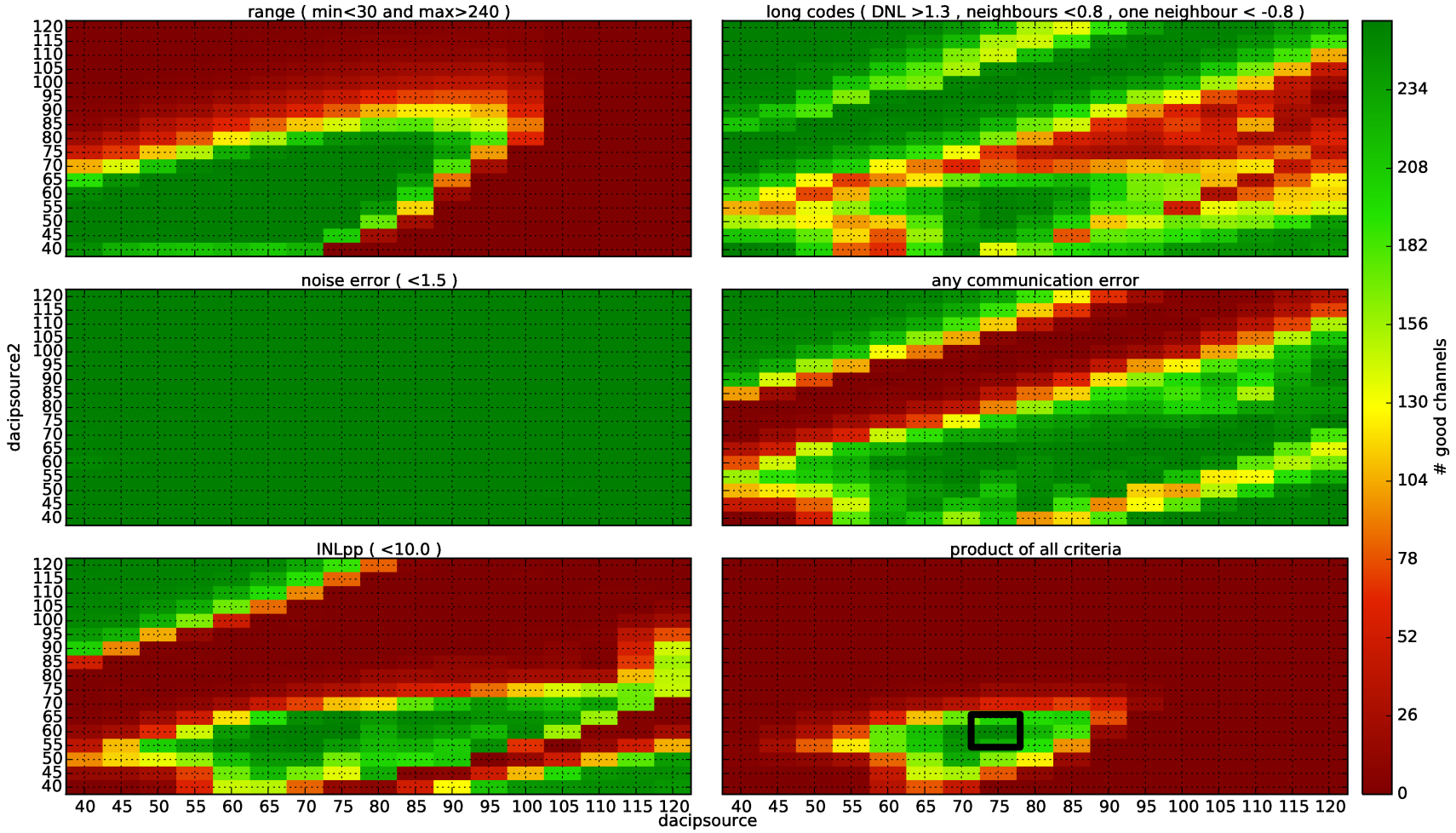
- **DACs as used by Bonn**
  - ITCP/ITCPL = 30/30
  - VTCSFN = 60
  - IAmpPBias = 60
  - IFBRef = 64
- **initial parameters**
  - IPSource: 75
  - IPSource2: 60
  - IFBPBias: 80
  - RefIn: 700 mV
  - Amplow: 200 mV
- **gain**
  - En30

- IPAddOut = 0
- IPDel = 127
- InjPSignal = 0
- IPDAC = 0
- IPSourceCasc = 64
- INMOS = 120
- ITCasc = 0
- VNSubOut = 0
- VNDel = 127
- IPAddIn = 0
- RefNWell = 64
- VPMOS = 120

H5.0.13 DCD4.1 IPSource-IPSource2 Opt.

optimal values: IPSource = 75
IPSource2 = 60

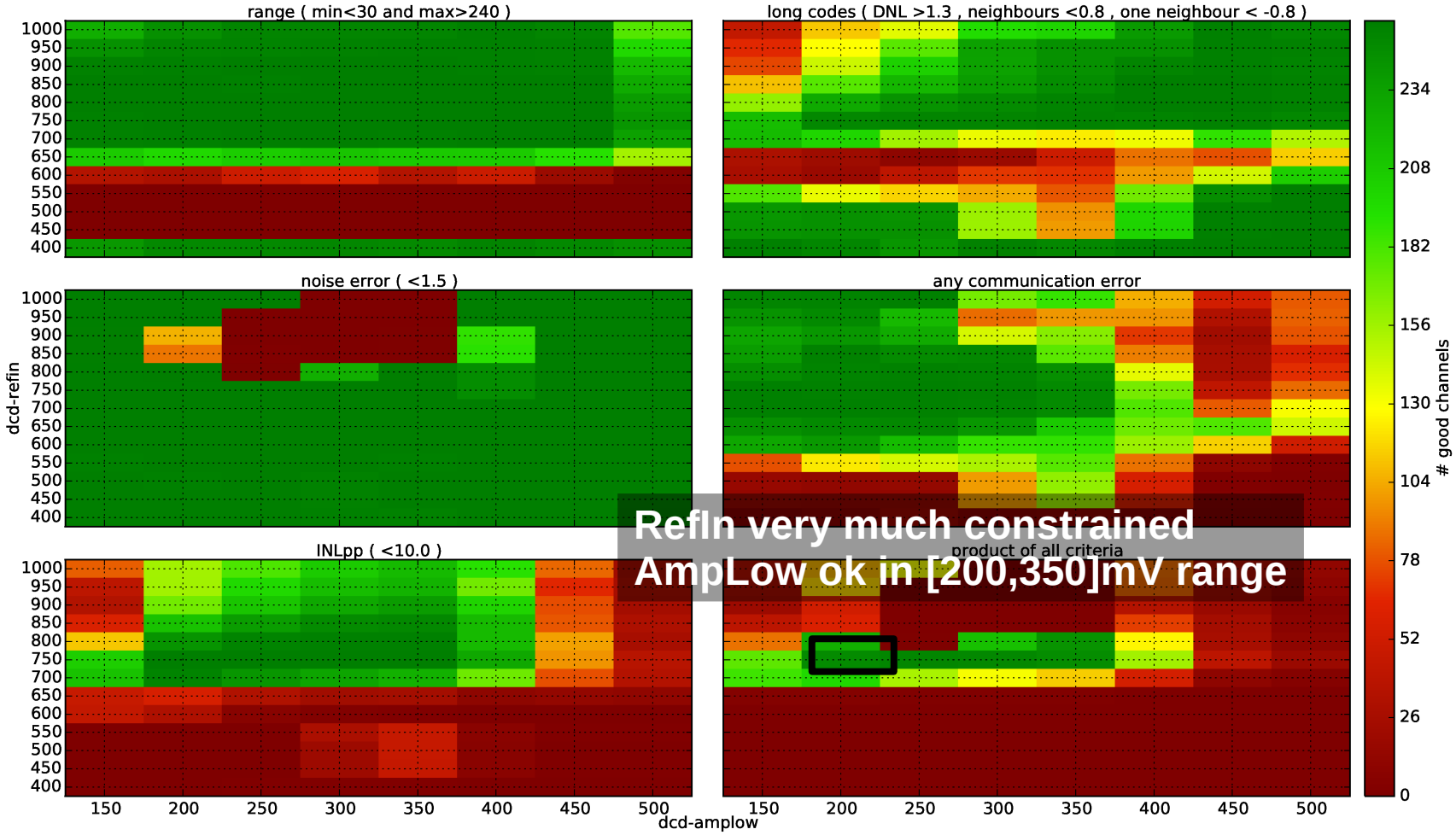
Bonn: IPSource = 70
IPSource2 = 60



H5.0.13 DCD4.1 RefIn-AmpLow Opt.

optimal values: **RefIn = 750 mV**
AmpLow = 200 mV

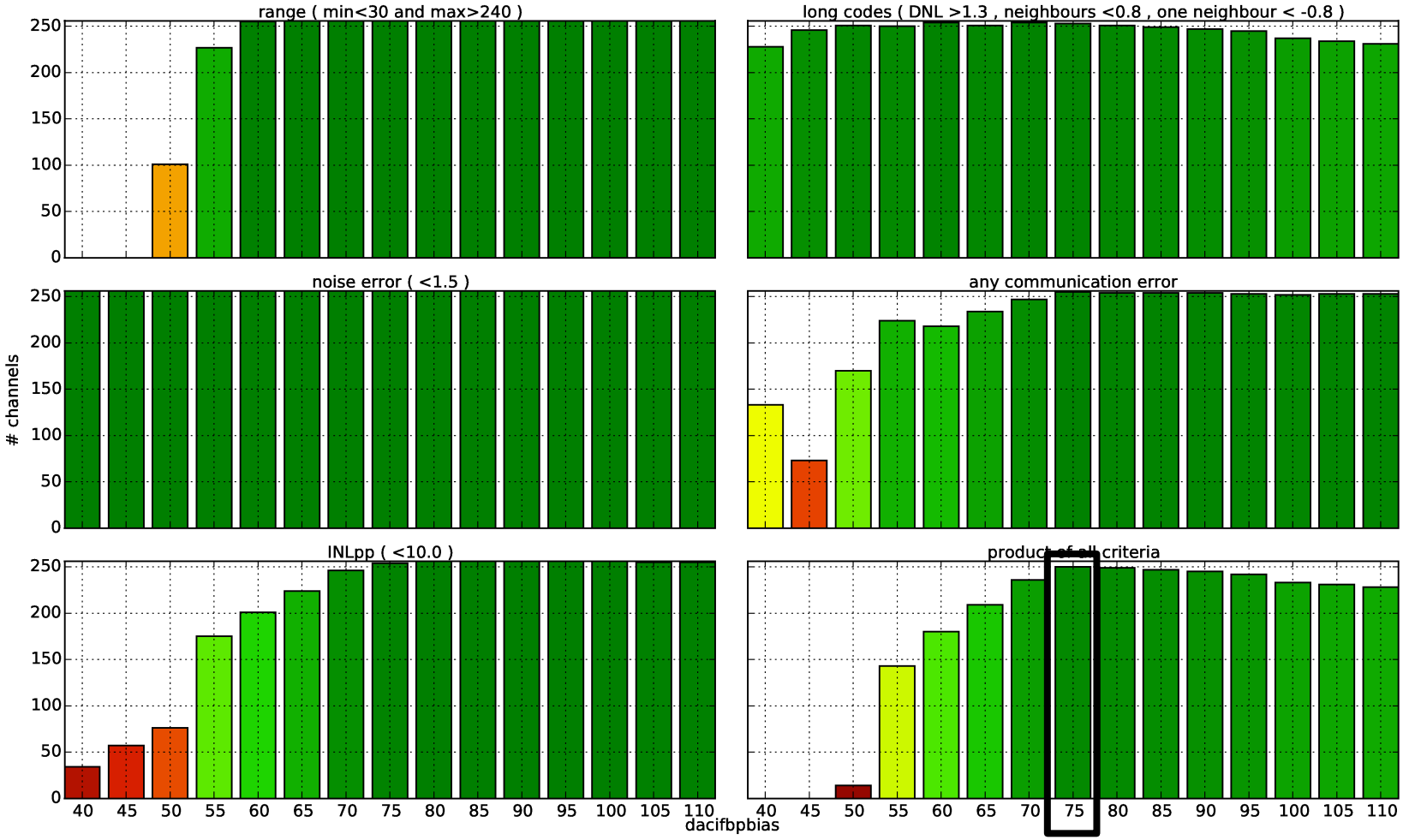
Bonn: RefIn = 700 mV
AmpLow = 200 mV



H5.0.13 DCD4.1 IFBPBias Opt.

optimal values: IFBPBias = 75

Bonn: IFBPBias = 80



H5.0.13 DCD4.1
Channel Statistic

- total channels: 256
- good channels: **253**
- bit error channels: 1
- comp error channels (DNL > 6): 0
- INL > 10 error channels: 2
- median LSB: 80.50 nA/ADU

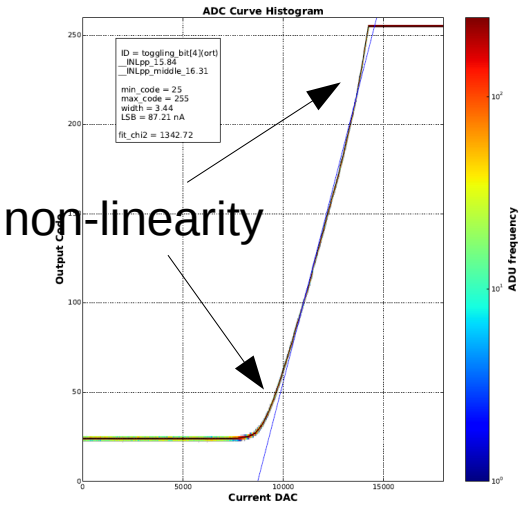
H5.0.13 DCD4.1
ADC Optimization Results

- **confirmed optimal working point for DCD4.1 as found by measurements in Bonn for H5.0.13**

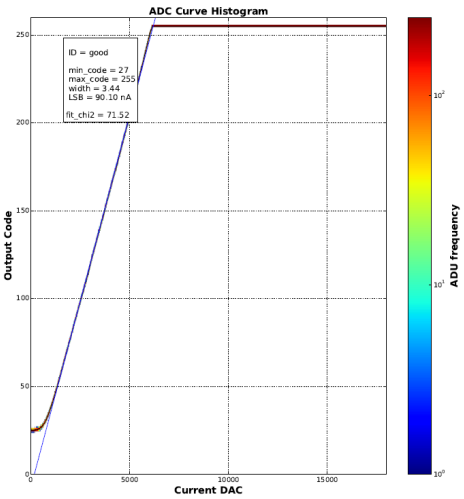
H5.0.13 DCD4.1 Goettingen Settings

- Reminder: Best Working Point in Goettingen different from the one in Bonn for H5.0.24

	Bonn	Goettingen
IFBPBias	80	70
IPSource	70	90
IPSource2	60	80
ITCP/ITCPL	30/30	20/5
IFBREF	64	0
ITCCASC	0	64
VNSubIn	11	7
AmpLow	200	450
RefIn	700	900



VnSubIn = 14



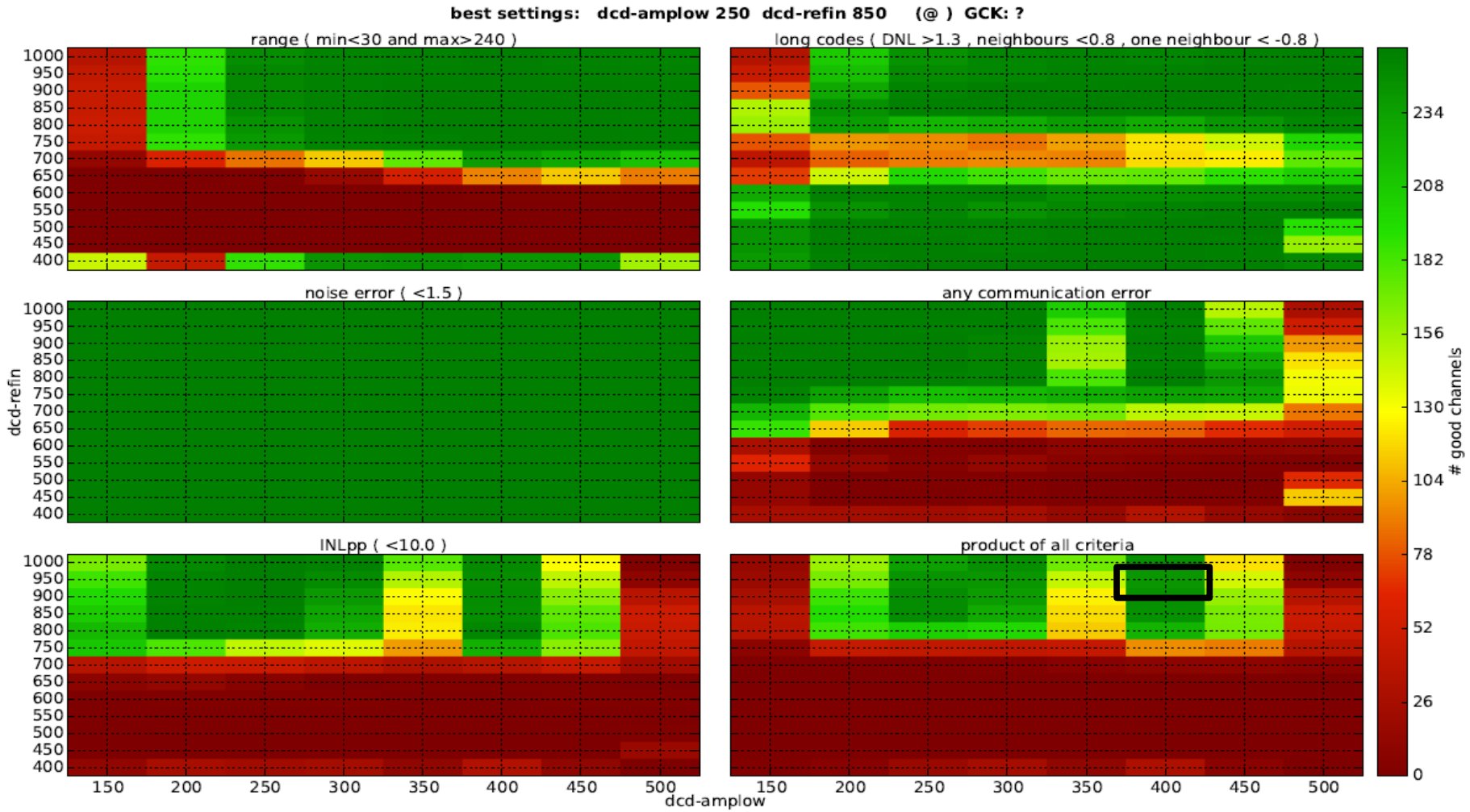
VnSubIn = 5

→ Goettingen Settings give bad results with Bonn Setup (for both H5.0.13 and H5.0.24), why?

→ We suspect that high values for VNSubIn have negative impact when used with Goettingen Settings (Linearity).

H5.0.13 DCD4.1 Refin-AmpLow Opt.

Result of RefIn-AmpLow Sweep with Goettingen Settings
→ Shifts optimal RefIn to higher values



H5.0.13 DCD4.1 Outlook

- check influence of non-sweeped DACs
  - can these DACs move the optimal working point?
- check influence of VNSubIn on measurement procedure (high monitor network load, TIA input characteristic, …)
  - high VNSubIn cause non-linear ADC curves
  - Ivan recommendation: VNSubIn <= 3 @En30 (high gain)
- received H5.0.14 with DCD4.2, equipped with Switcher and small matrix
  - DHE and gate source optimization starting tomorrow
  - planning offset DAC measurements